Mortality Transition and Family Formation in Two Quarters of Gaza City

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ABSTRACT

This thesis is the first in-depth investigation of demographic trends in the Gaza Strip. The Palestinian populations of ash-Shati refugee camp and the ash-Shaja'iyya quarter of Gaza city were surveyed in 1985 to obtain estimates of fertility and mortality. These estimates are examined and the findings are interpreted in the context of historical data on demographic change in other Palestinian communities.

Variations in marriage and fertility patterns are described. As in other Arab populations, the rise in the female age at first marriage is a major contributor to changes and differentials in fertility. But a unique finding is that in these two Muslim communities the norm of universal marriage for women was disrupted, primarily due to a shortage of spouses through sex-selective emigration. After loss of exposure to union, lactational amenorrhoea plays the most important role in suppressing fertility. However, even the refugees, who have had access to family planning services for twenty years, make limited use of contraception. Reasons for these findings are discussed.

The mortality analysis establishes the secular trend in the age pattern of child deaths, but focuses largely on mortality differentials. Log-linear rates models are used to estimate the effect of demographic and socio-economic variables on the risk of death in childhood. When all births are included in the model and other influences simultaneously controlled, the most important co-variates of mortality are the length of the preceding birth interval and mother's age together with mother's education, household wealth and period of birth. Other factors such as public health measures and therapeutic medicine, which cannot be quantified but which may have contributed to the mortality transition, are also considered.

A separate analysis reveals that, by the 1980s, when the majority of child deaths occurred in the first half of infancy, it was the daughters of poorly educated older women who did not use ante-natal care who were most likely to die. Possible explanations for this finding emerge from a brief examination of childcare practices.

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CHAPTER 1

INTRODUCTION

1.1 Background

The demography of the Palestinians and the history of Palestine are inextricably intertwined. The earliest attempts to estimate the size of the population of Palestine were politically and economically motivated. Both Roman and Ottoman counts of the inhabitants in this region were designed to maximise tax revenue for the centres of power. Later the Ottomans used population registers to identify males for conscription into their army. The numerous Christian churches associated power with the size of their membership and many converts were rewarded for changing their allegiance. But it is Zionism, and its impact on the demography of Palestine, that has determined the course of modern Palestinian history.

In the mid-19th century, Jews comprised fewer than 5 per cent of the inhabitants of the Ottoman provinces, which were to become Palestine. Even in 1917, when the British government declared in writing its support for a Jewish national home in Palestine, Muslim and Christian Arabs in the area outnumbered Jews by almost twelve to one. During the British Mandate, which began in 1920, political considerations shaped the government's population policy. The borders of Palestine remained open to Jewish immigrants until the late 1930s. By the end of 1939, the Arab population numbered about 1.1 million and there were about 450,000 Jews present in the country (see Tables 1.1 and 1.2). The influx of immigrants contributed to the shift in the balance of power in Palestine. In 1947, Britain handed the problem of Palestine to the United Nations and in November the General Assembly voted to partition the country. The Arab members of the United Nations and the Palestinians rejected the plan, which gave almost 60 per cent of the land area to the Zionists. Fighting broke out between Arabs and Jews. Britain completed its withdrawal from Palestine on May 14th, 1948; at midnight the Jewish community declared its independence as the state of Israel. The subsequent arrival of Arab forces from neighbouring countries failed to reverse the fortunes of the indigenous

Table 1.1 Population estimates, Palestine, Israel and the Occupied Territories

	Year	Per cent		Total
		Arabs and others	Jews	(thousands)
Palestine	1922 Census	88.9	11.1	757.3
	1931 Census	83.1	16.9	1035.8
	1944	67.4	32.6	1698.0
	1947 – March	69.1	30.9	1908.8
Israel	1948 Registration of population - November	17.9	82.1	872.7
	1961 Census	11.3	88.7	2179.5
	1972 Census	12.4	87.6	3066.8
	1983 Census	14.5	85.5	3918.2
Gaza Strip	1944	99.8	0.2	65.0
				Palestinians
	1952			294.6
	1964			412.3
	1967 Census			353.8
	1987a			564.1
	1987b			633.3
West Bank	1952 Census			742.3
	1961 Census			805.5
	1967 Census			667.2
	1987a			993.2
	1987b			1201.1

Notes:

1. Estimates are for end of year except Palestine 1947, Israel 1948, and census figures.
2. *De jure* estimates: Israel 1961, 1972, 1983 and Gaza Strip and West Bank 1987b, all others are *de facto*.
3. The 1972 and 1983 figures for Israel include Jews living in East Jerusalem and other occupied areas. The Palestinian population of East Jerusalem is included in the West Bank population totals. At the time of the 1983 Israeli Census, 97.6 per cent of Jerusalem's Palestinian population lived in the area of the municipality which was occupied in 1967 (calculated from Schmelz, 1987, p. 114 and JIIS, 1985, p. 36). The 1972 figures for Israel and the 1987a figure for the West Bank assume there was no change in this proportion.

Sources:

Palestine

1947	31 March - the last Palestine Government official estimates (Palestine, DS, 1948, p. 80).
Other years	Palestine, DS (1947), pp. 3, 6.

Israel

All	Israel, CBS (various years) *Statistical Abstract of Israel*; see also note 3 above.

Gaza Strip

1944	Calculated from Hadawi (1970), pp. 45-46.
1952, 1964	Abu-Lughod (1980), pp.18, 25. The estimates are taken from *Bulletin de Statistiques Officielles* (year not stated), issued by the Egyptian Governor General of Palestine for Gaza. Abu-Lughod notes that the Egyptian figures are 'overcounts', because of incomplete death registration.
1967	Israel, CBS (1967), p. xx.
1987a	Israel, CBS (1988) SAI, p. 705.
1987b	Benvenisti and Khayat (1988), p. 109. The estimate is based on Civil Administration data which are derived from the number of new format identity cards issued in the early 1980s.

West Bank (including East Jerusalem)

1952, 1961	Abu-Lughod (1980), pp. 18, 20.
1967	Israel, CBS (1967), p. x and Israel, CBS (1968b), p. 10.
1987a	Israel, CBS (1988) SAI, p. 705 and JIIS (1989), p. 50; see also note 3 above.
1987b	Benvenisti and Khayat (1988), p. 28 and JIIS (1989), p. 50; see also note 3 above.

Table 1.2 Selected chronology of Palestinian history

Year	
1516-1917	Palestine incorporated into Ottoman Empire.
1916	Sykes-Picot Agreement; British and French agree to partition the Ottoman Empire.
1917	Balfour declaration: His Majesty's Government view with favour the establishment in Palestine of a national home for the Jewish people and will use their best endeavours to facilitate the achievement of this object, it being clearly understood that nothing shall be done which may prejudice the civil and religious rights of existing non-Jewish communities in Palestine…(Barbour, 1969, p. 61). British troops occupy Jerusalem; end of Turkish rule.
1920	Anti-Zionist riots during festival of Nabi Musa. First British High Commissioner arrives in Jerusalem.
1922	League of Nations approves the British Mandate for Palestine and Transjordan.
1929	*Al-Buraq* riots in Jerusalem and Hebron.
1935	Beginning of Arab rebellion.
1936-1939	Arab Revolt.
1937	Peel Commission recommends partition of Palestine (First Partition Plan).
1947	British decide to relinquish Palestine Mandate; pass on problem of Palestine to United Nations. UN General Assembly calls for establishment of two independent states, one Arab, one Jewish, in Palestine (Second Partition Plan).
1948	British withdrawal from Palestine. *Al-Nakba*, The Catastrophe: estimated 13,000 Palestinians killed and 714,000-744,000 Palestinians expelled from the territory occupied by Israel (Khalidi, 1992, pp. 581-583). Declaration of State of Israel.
Gaza Strip	
1948	About 200,000 refugees arrive in Gaza Strip (Dahlan, 1987, p. 25).
1948-1949	All-Palestine Government in Gaza Strip.
1949-1967	Gaza ruled by Egyptian Military Government.
1952	Egyptian revolution, Nasser becomes president.
1956-1957	British-French-Israeli invasion of Suez. Israel occupies Gaza Strip for four months.
1967	Israel occupies Gaza Strip, Sinai, West Bank and Golan Heights.
1967-1968	Estimated 75,000 Palestinians leave Gaza Strip and 25-50,000 others prevented from returning from abroad (Abu-Lughod, 1984, p. 260).
1967-1994	Gaza ruled by Israeli Military Government.
1994	Cairo Accord: Israel-Palestine Liberation Organization agreement on the Gaza Strip and Jericho areas. Palestinian National Authority takes control of self-rule areas of Gaza Strip.

Arabs. When armistice agreements were signed in January 1949, Israel controlled 77 per cent of Palestine and up to 750,000 Palestinian refugees from towns and villages in this area were on the wrong side of the border.

Political events and considerations influence the collection, analysis and interpretation of demographic data on the Palestinians. The interests of governments and administrative organisations determine whether or not data are collected, what items of information are gathered, and which data are published. Where the interests of the population differ from those of the collectors, the consequence may be either the provision of inaccurate information or the failure to supply any information.

For example, all governments in the Middle East recognise that censuses provide indispensable information on the demographic characteristics of the enumerated populations. Most have demonstrated their commitment to obtaining reliable estimates of fertility and mortality levels by conducting at least one demographic sample survey. Equally, political priorities sometimes override the concern to establish accurate demographic indicators. Lebanon is the best-known case. This country has not conducted a census since 1932 because the relative size of the various religious groups is used to allocate government positions and seats in the Chamber of Deputies. A parallel situation prevails in some of the territories that Israel occupied in 1967. Three months after the occupation, the military authorities carried out a census of the West Bank and the Gaza Strip and collected information on fertility and child mortality. Over the course of the next 25 years, however, no attempt was made to repeat the exercise. Whatever the explanation for this state of affairs, it does not reflect well on the Israeli government.

Politics also influences decisions to include or exclude questions on particular topics. The Palestinians living in Israel were enumerated in the 1961 Israeli census and again in the censuses of 1972 and 1983, which also covered the Palestinian residents of annexed Arab Jerusalem. On each occasion, 20 per cent of households completed a supplementary schedule, which included a question on lifetime fertility. In 1972 and 1983 the complementary question on surviving children was omitted. The fact that Israeli demographers have also conducted two fertility surveys, again without mortality components, is further evidence of their preoccupation with both Arab and Jewish levels and patterns of childbearing.

The situation in Jordan is slightly different. In 1950, Jordan annexed that part of eastern Palestine which had not fallen to the Zionist state. As it lies to the west of the Jordan river, the area became known as the West Bank. The 1961 Jordanian census

included questions on the number of children ever-born and the number of children still alive. Fertility and child mortality rates for West Bank Palestinians can be estimated from the regional breakdown of results. However, because the Palestinians living on the East Bank were not distinguished from Jordanians, no comparable figures exist for this section of the community. When the next Jordanian census was conducted in 1979, the West Bank was no longer under Jordanian control. This enumeration collected information on place of birth but the published results did not disaggregate tables by place of birth. The most likely explanation for this selective suppression of data is that Palestinians comprise such a high proportion of all residents in Jordan that the publication of the number is perceived to represent a threat to political stability.

The completeness and quality of demographic data are influenced by the conditions in which data are collected. The residents of the West Bank and Gaza Strip have adopted a pragmatic approach to registration of vital events. Many are only willing to go through the series of time-consuming, and often humiliating, encounters with the bureaucracy if the document which confirms the occurrence of a particular event serves a useful purpose for them. Palestinians need identity documents and require birth certificates to obtain them. Timing, however, is not critical. The first step in the process may be postponed for months or even years. If a child dies before an application for a certificate has been submitted, the birth may never be registered. Although the completeness of birth registration has improved significantly since 1967, the birth rates computed from registered events are not completely reliable. In contrast, the situation with regard to death registration data is clear: they are inaccurate because many deaths are not recorded. The reason for this is that the families of dead individuals forfeit nothing if a death certificate is not procured.

Similar factors affect the statistics collected by the United Nations Relief and Works Agency for Palestinian Refugees (UNRWA). This agency was created by the United Nations in 1949 to provide support for the refugees. It maintains population registers in the five areas in which it operates - the Gaza Strip, the West Bank, Jordan, Syria and Lebanon. Reliable demographic measures are required by the UNRWA for planning purposes. When individuals die or emigrate to another country, their registration documents are supposed to be returned to the UNRWA. However, Palestinians gain nothing by surrendering their refugee cards. Because of the unpredictability of the future, even the most optimistic emigrants are wary of relinquishing their families' entitlement to free basic health and education services in the area where they are registered. Some

simply resent giving up the only documentary evidence they have of the international community's acknowledgement that they were wronged in 1948.

The under-reporting of deaths is directly related to the relief function of the agency. Until 1982, a large proportion of the refugees received a basic food and fuel ration every month. For ration recipients, notifying the authorities of a family death was equivalent to applying for a reduction in benefits. For others, reporting a death brings no reward. Conversely, free maternal and childcare services ensure that almost all births to registered refugees are promptly recorded.

Voluntary migrants pose their own measurement difficulties. Since the calamitous events of 1948, labour migration has dominated the experience of the majority of Palestinian families. Much work remains to be done on the socio-economic and political causes and consequences of the mobility of the Palestinian population. However, even where the host governments collect data on vital rates for the total population, statistics are not available for resident Palestinians. One reason for this is the instability of the Palestinian communities. But the most important factor is that, as in Jordan, the published data do not permit the identification of individuals of Palestinian descent, probably because of political sensitivity.

1.2 The origins of the present study

It is clear from the preceding discussion that demographic data on the Palestinians is in short supply. This is a consequence of their statelessness and lack of control over their own lives. In the late 1970s, however, the situation began to change. The first development was the dissemination of knowledge of methods for deriving reliable demographic indicators from small surveys. Second, Palestinians realised that the best way to acquire information was to collect it themselves. In 1979, the Palestinian Central Bureau of Statistics based in Lebanon commenced a series of surveys of the refugee camps in Lebanon and Syria. Around the same time, researchers at Birzeit University, the leading Palestinian educational institution in the West Bank, started to investigate the economic and social conditions prevailing in the Occupied Territories.

This thesis aims to gather and describe information on fertility and child mortality in two Gaza communities and thereby to contribute to the efforts to dispel the politically-rooted ignorance that prevails about the demography of the Palestinians. To set the context for the Gaza study, the first objective is to review the documentary evidence of

Table 1.3 Population by type of place of residence, Palestine, Jerusalem and the Occupied Territories

	Number of urban localities	Percentage of population in urban areas				
		Muslims	Christians	All Arabs	Jews	Total
Palestine						
1922	23	23.5	75.4	29.1	81.9	34.9
1931	23	24.8	75.8	30.1	73.6	37.4
1944	29	30.2	79.5	35.9	75.0	48.6
Israel						
1961	65	-	-	25.7	84.6	77.9
1972	99	-	-	45.9	90.4	84.9
1983	150	-	-	83.7	90.2	89.2

	Urban	Refugee camps	Rural*	Total
Gaza Strip				
(1944)	70.0	-	30.0	100.0
1967	41.6	48.8	9.6	100.0
West Bank (including E. Jerusalem)				
1967	31.1	8.9	60.0	100.0
1967b	45.2	-	54.8	100.0
1987	47.6	-	52.4	100.0

* Includes nomads and persons living outside settlements, who number less than 1 per cent of the totals.

Note: It is not possible to estimate the distribution of the 1967 Gaza Strip population by locality. According to Benvenisti and Khayat (1988, p. 112) in 1987, 70.7 per cent of the total lived in the municipalities of Gaza, Khan Yunis, Rafah and Dayr al-Balah and the refugee camps adjacent to these towns. The comparable figure for 1967 was 66.9 per cent (calculated from Israel, CBS, 1967).

Sources: As Table 1.1, except West Bank 1967b, calculated from Benvenisti and Khayat (1988), p. 28 and Israel, CBS (1968b), p. 10.

demographic change and associated historical and socio-economic developments in all parts of Palestine. The second objective is to establish reliable estimates of levels and trends in fertility and child mortality in the study population. The third objective of the thesis is to examine fertility and child mortality differentials within the population and to assess the contribution of demographic and socio-economic factors to the observed patterns.

The decision to conduct a demographic survey in the Gaza Strip was taken in conjunction with staff at Birzeit University's Community Health Unit. All research projects undertaken by the Community Health Unit have a common aim: to identify factors affecting the health of Palestinians living in the Occupied Territories. Gaza was selected as the area for this study because, in the mid-1980s, the population residing in the Gaza Strip had received even less attention than the Palestinian communities of the West Bank. Within Gaza, the choice of Gaza city was, in the first instance, determined by practical considerations. These included transportation difficulties and the poor quality of maps available for areas beyond the boundaries of Gaza city. Moreover, in contrast to the

population of the West Bank, the majority of the Gaza Strip's inhabitants are urban residents (Table 1.3). Gaza city and ash-Shati, the adjacent refugee camp, comprise the largest single population centre. In addition, the Palestinian inhabitants of the towns and cities in the Occupied Territories have been largely neglected by indigenous researchers. Since living conditions in Palestinian villages are, in general, inferior to those in urban areas, this focus on rural areas may be justified, especially when the research is designed to identify priorities for action-orientated health, social or economic programmes. Nevertheless, studies of urban populations are important for at least two reasons. First, urban populations are not homogeneous; demographic and economic differentials within cities may be as large as those between urban and rural areas. Second, the evidence from most developing countries shows that demographic change, specifically the transition from high to low mortality and declines in fertility, usually begins in urban centres and is subsequently, several or many years later, paralleled in the less developed regions of the country. Fieldwork for the survey of the ash-Shaja‘iyya quarter of Gaza city and the ash-Shati refugee camp was carried out in the summer of 1985.

The thesis is organised as follows: several of the important issues which must be addressed emerge from the comparison of the survey results with Palestinian fertility and mortality trends under British and Israeli rule. This background is presented in Chapters 2 and 3. The survey and the methods used to analyse the data are described in Chapter 4. An overview of the development and characteristics of the study communities is provided in Chapter 5. Chapter 6 discusses marriage and Chapter 7 presents the main results on levels, trends and determinants of fertility. Chapter 8 describes the levels and trends in child mortality and examines some mortality differentials. The mortality investigations in Chapters 9 and 10 seek to establish the most important co-variates of child survival. In Chapter 9, all births are included in the analysis; in Chapter 10, the analysis is restricted to births in the three years preceding the survey. These analyses focus on variations in mortality at the inter-household level and the intra-family level, levels for which little data are available for Palestinians. In addition, the contributions of factors such as public health measures to the observed mortality decline are discussed. Following the mortality analyses, several aspects of infant care are considered in an attempt to identify mechanisms, which render individual children at risk. The findings and their implications are drawn together in the conclusions in Chapter 11.

CHAPTER 2

PALESTINIAN FERTILITY

2.1 Introduction

The Gaza city communities are descendants of a small segment of the population who shared the experiences of Ottoman and British rule. Some of both the disruptive and more gradual processes which have impacted on the lives of Gazans also affected other Palestinians who remained in Palestine after 1948. To set the context for, and enhance the interpretation of, the fertility results of the Gaza city survey, this chapter describes the published data on Palestinian fertility and reviews the studies which attempt to explain the observed trends and differentials. Discussion of the underlying determinants of fertility in this chapter reflects the modernisation theory approach of the literature on Palestinian fertility (Friedlander, Eisenbach and Goldscheider, 1979), while proximate determinants are elucidated with reference to Davis and Blake (1956) and Bongaarts (1978).

Political changes inconvenience researchers because they cause discontinuities in statistical series. The Palestinian population remaining in Palestine after 1948 was fragmented into three parts: those living in the Israeli state, residents of the West Bank who came under Jordanian rule, and inhabitants of the Egyptian-administered Gaza Strip. Shortly after its 1967 occupation of the West Bank and the Gaza Strip, however, Israel annexed Arab Jerusalem and adjacent parts of the West Bank and subsequently included the populations of these areas in the statistics for the Israeli state. Thus, in this, and the following chapter, the post-1967 statistics for Israeli Arabs include Jerusalem Palestinians. Conversely, although Jerusalem Palestinians are part of the West Bank Palestinian community, they are excluded from the post-1967 Israeli statistics for the West Bank. This chapter first discusses data for Palestine, then Israel, and finally the Occupied Territories.

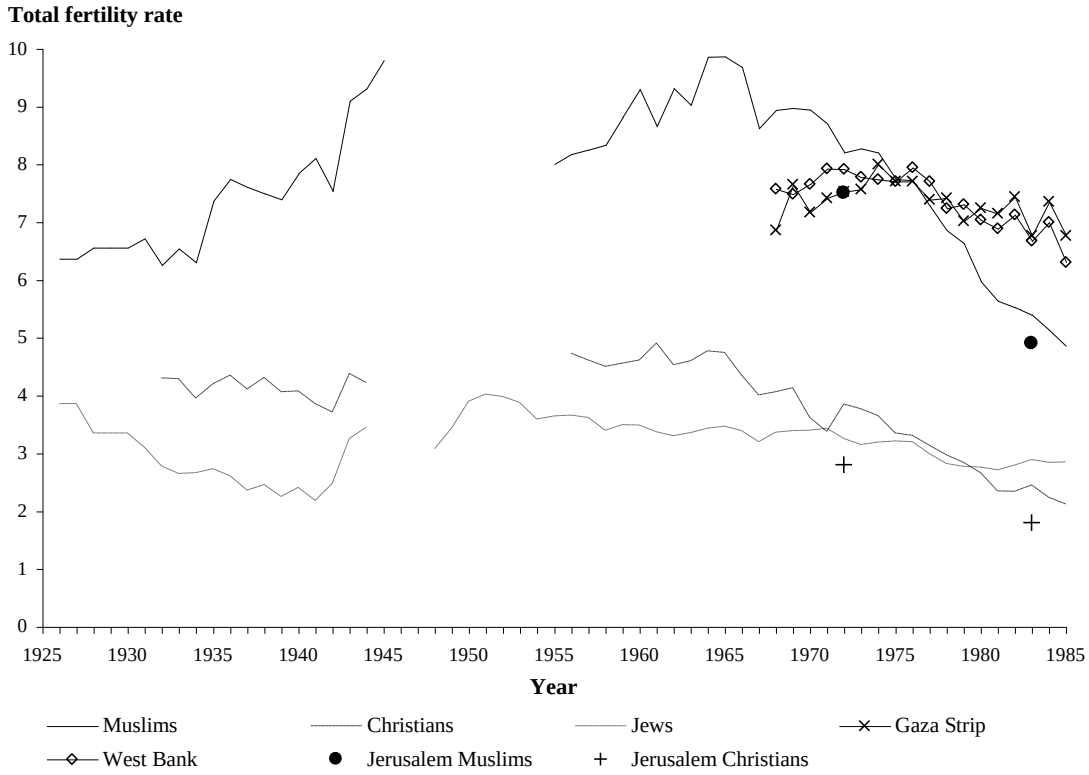

Figure 2.1 Reported total fertility rates, Palestine, Israel and the Occupied Territories, 1927-85

Sources: Palestine Government (1946) Vol. III; Israel, CBS (various years) SAI, (1987b), (1996); Schmelz (1987).

2.2 Palestinian fertility levels and trends

2.2.1 Palestine

The British introduced compulsory registration of vital events in Palestine in 1920. Three other significant developments in the collection of population statistics followed: the 1922 Census (data only available in broad age groups: 0-4, 5-14, 15-24 and 25+), the 1931 Census, and the Palestine equivalent of the England and Wales 1938 Population (Statistics) Act which provided for the collection of information on birth order and parents' ages on the birth registration form.

Published total fertility rates for Palestine and Israel are presented in Figure 2.1. According to the Mandate government figures, Muslim fertility increased from around 6.5 births per woman in 1930 to 9.4 births per woman in 1943-45. In contrast, Christian fertility declined slightly from 4.3 births per woman in 1930-32 to 4.0 in 1940-41 then increased to 4.3 in 1943-44. The trend for Jews was similar to that for Christians with total fertility rates of 3.9 in 1926-27, 2.4 in 1940-42 and 3.4 in 1943-44.

Table 2.1 Age-specific and total fertility rates, Palestine 1938-45 and Israel 1955 and 1965

Age group	Palestine								Israel	
	1938	1939	1940	1941	1942	1943	1944	1945	1955	1965
Muslims										
15-19	0.098	0.083	0.079	0.084	0.080	0.071	0.102	0.094	0.139	0.133
20-24	0.367	0.362	0.401	0.386	0.354	0.437	0.404	0.410	0.357	0.393
25-29	0.443	0.430	0.463	0.497	0.459	0.612	0.620	0.692	0.358	0.448
30-34	0.255	0.256	0.268	0.283	0.263	0.322	0.346	0.382	0.357	0.434
35-39	0.241	0.242	0.248	0.255	0.234	0.261	0.271	0.282	0.222	0.318
40-44	0.074	0.081	0.084	0.088	0.084	0.085	0.087	0.075	0.121	0.177
45-49	0.023	0.026	0.028	0.030	0.034	0.032	0.034	0.028	0.038	0.070
Total fertility	7.5	7.4	7.9	8.1	7.5	9.1	9.3	9.8	8.0	9.9
Christians										
15-19	0.084	0.078	0.065	0.057	0.066	0.077	0.074		0.064	0.053
20-24	0.226	0.207	0.218	0.212	0.216	0.242	0.240		0.239	0.243
25-29	0.231	0.224	0.228	0.210	0.203	0.248	0.234		0.363	0.279
30-34	0.171	0.161	0.167	0.160	0.143	0.172	0.162		0.249	0.220
35-39	0.120	0.111	0.109	0.104	0.091	0.112	0.107		0.118	0.114
40-44	0.028	0.027	0.026	0.023	0.020	0.023	0.025		0.031	0.035
45-49	0.003	0.004	0.003	0.006	0.003	0.004	0.003		0.006	0.003
Total fertility	4.3	4.1	4.1	3.9	3.7	4.4	4.2		4.9	4.7
Jews										
15-19	0.028	0.025	0.023	0.019	0.025	0.031	0.029			
20-24	0.141	0.126	0.130	0.116	0.132	0.164	0.154			
25-29	0.162	0.158	0.178	0.163	0.183	0.221	0.213			
30-34	0.089	0.082	0.094	0.088	0.104	0.156	0.197			
35-39	0.055	0.044	0.044	0.038	0.042	0.062	0.080			
40-44	0.014	0.013	0.012	0.012	0.010	0.014	0.016			
45-49	0.002	0.002	0.001	0.001	0.002	0.002	0.001			
Total fertility	2.5	2.3	2.4	2.2	2.5	3.3	3.5			

Sources: Palestine Government (1946) Vol. III, pp. 1166, 1177; Loftus (1948), p.109; Israel, CBS (1987) SAI, p.120.

The most problematic measures in Figure 2.1 are the total fertility rates for Muslims in Palestine. These figures, aggregated for two- and three-year periods, are presented in Bachi (1977, p.196) and are frequently cited by demographers (for example, Friedlander, Eisenbach and Goldscheider, 1979 and Hill, 1983). Those of the constituent age-specific fertility rates that appear in accessible reports and studies are reproduced in Table 2.1 together with the rates for Muslims in Israel in 1955 and 1965. It is clear from the rates in Table 2.1 that the published total fertility rates for Muslims in Palestine are unreliable. The most implausible age-specific measures are the low rates for women aged 15-19 in 1938-45 and the very high rates for women aged 25-29 in the mid-1940s. These irregularities are discussed in greater detail in Appendix A but, in brief, the most significant errors in the Mandate rates for Muslims result from the use of denominators derived from the imperfect age distribution of a single census.

P.J. Loftus, the Government Statistician in the 1940s, suggests that the most reliable estimates of the Muslim total fertility rates during the Mandate are obtained using the simple formula of general fertility rate multiplied by the length of the reproductive period. This, '… removes all inaccuracies due to ages of mothers and retains only part of the age errors of the census population' (Loftus, 1948, p.111). Loftus argues that, because the birth registration data reveal that mothers tended to exaggerate their ages, the most correct procedure is to attribute all confinements to the female population aged 15-44 and to use this age group for calculating the general fertility rates. This is not convincing. The total fertility rates derived from the data for women aged 15-44 are 6.9 in 1926, 7.3 in 1931, 8.1 in 1936, 7.3 in 1938-39, 7.2 in 1940-42 and 8.1 in 1943-45. The rates based on the number of women aged 15-49 are 7.5, 7.9, 8.5, 7.6, 7.5 and 8.4 for the same time periods. Both sets of rates are, however, sensitive to genuine fluctuations in the age structure of the female population and the evidence for significant fluctuations, particularly a deficit of survivors from the decade around the First World War, is overwhelming. In the light of this and other issues of data quality which are discussed in Appendix A, it seems reasonable to summarise the trends suggested by the period fertility data for Muslims with two broad statements. First, during the late 1920s and the 1930s the total fertility rate probably fluctuated between 7 and 8 births per woman, and second, although with less certainty, the level of childbearing may have increased gradually to no more than 8.5 births per woman in the mid 1940s.

In 1944, the Palestine government conducted a detailed survey that included measures of lifetime fertility. Information was collected from all households in five unnamed villages in the Ramleh and an adjacent sub-district in southern Palestine (Palestine, DS, 1945). The Muslim populations in the villages derived their livelihood from cereal cultivation. These communities are not necessarily representative of all Muslims in Palestine. The findings are, however, important to this study because over 75 per cent of the refugees in the Gaza city survey originated from villages with similar economies within 30 kilometres of the five that were surveyed in 1944.

The data collected in 1944 included the number of children ever-born to 616 ever-married women aged 13-52 and the number who had died. The results of the survey are presented in Table 2.2. With the exception of the rather low mean parity for women aged 18-22, the mean parities for all women are plausible and the figures show a progressive increase with age. Women aged 28-32 in 1944 had given birth to an average of 4.8

Table 2.2 Mean number of children ever-born (CEB) and proportions who had died (PD), selected groups of women, five Palestinian villages 1944, and mean number of children ever-born, Muslims in Israel 1961

Palestine, five southern villages, 1944					Israel, Muslims, 1961		
Age group	All women		Ever-married women	Women currently in first marriage	Women currently in first marriage*		Age group
	CEB	PD	CEB	CEB	Villages CEB	Total CEB	
13-17	0.0	0.00	0.1	0.1			
					0.8	0.9	15-19
18-22	1.0	0.34	1.1	1.1			
					2.4	2.3	20-24
23-27	3.1	0.34	3.1	3.2			
					4.2	4.0	25-29
28-32	4.8	0.36	5.1	5.1			
					6.2	6.1	30-34
33-37	6.0	0.35	6.2	6.1			
					7.9	7.5	35-39
38-42	6.6	0.38	6.7	7.5			
					7.8	7.9	40-44
43-47	7.1	0.40	7.2	8.3			
					8.3	8.2	45-49
48-52	7.1	0.40	7.1	8.0			

* Data for Israel are only available for women currently in their first marriage.

Sources: Palestine, DS (1945), p. 445; Israel, CBS (1965), pp. 24-25; Israel, CBS (1966), p. 72.

children and the mean parity for women aged 43-52 was 7.1. The high and increasing proportion of dead children suggests that any bias arising from the omission of dead children is likely to be small. Table 2.2 also shows the 1961 Israeli Census mean parities for currently married women in their first marriage. These are the only mean parities published from the 1961 Israeli Census and are the earliest set of comparable data available. Currently married village women at the end of their reproductive life span in the mid-1940s had given birth to an average of 8.2 children and, 15 years later, the completed family size of the comparable group in Israel was exactly the same. There is very little difference in the achieved fertility of currently married women in their twenties in 1944 and 1961, but women in their thirties in 1944 reported relatively few children. In combination, these results are consistent with the idea that the fertility of young Muslim women increased towards the end of the period of British rule.

2.2.2 Israel

The Israeli state inherited and improved the vital registration system and conducted full censuses of the population in Israel in 1961 and of the populations of Israel and Arab Jerusalem in 1972 and 1983.

Table 2.3 Relative levels of age-specific and total fertility, Israeli Muslims and Christians

Age group	Age-specific fertility rate	Level relative to 1965 (=100)						
	1965	1966	1967	1968	1969	1970-4	1980-4	1990-4
Muslims								
15-19	0.133	91	77	59	102	89	51	43
20-24	0.393	102	96	87	103	97	69	62
25-29	0.448	100	91	98	93	91	65	58
30-34	0.434	99	88	93	89	83	56	47
35-39	0.318	97	89	95	88	85	51	39
40-44	0.177	95	76	93	72	69	34	24
45-49	0.070	89	56	81	71	53	13	6
15-24	2.6	100	92	80	103	95	64	57
25-49	7.2	98	86	94	87	83	53	44
Total fertility	9.9	98	87	91	91	86	56	47
Christians								
15-19	0.053	101	89	54	82	75	38	30
20-24	0.243	90	89	86	98	84	63	55
25-29	0.279	95	88	86	88	79	56	54
30-34	0.220	92	76	84	84	73	44	40
35-39	0.114	82	85	96	76	72	39	33
40-44	0.035	77	77	91	75	61	27	21
45-49	0.003	239	55	221	45	52	12	48
15-24	1.5	92	89	81	95	83	58	51
25-49	3.3	91	83	88	84	74	47	44
Total fertility	4.7	92	85	86	87	77	51	46

Source: Israel, CBS (various years) *Statistical Abstract of Israel*.

The earliest estimate of the total fertility rate for Muslims who remained in the area that became Israel is 8.0 in 1955. Fertility subsequently rose sharply and peaked at 9.9 in 1964 and 1965. Over the course of the following two decades Muslim fertility dropped by over 50 per cent (see Figure 2.1). In 1955, the total fertility rate for Christians was 5.0 and childbearing remained at this level for a decade. From 1966 onwards, the trend was downwards but with more significant fluctuations than in the Muslim rates. By 1985, the total fertility rate for the Christian population had reached 2.12 which is close to replacement level. The earliest estimates of the total fertility rates for Arabs in Israel may be imprecise. The reporting of ages, both at the 1961 census and on birth certificates cannot have been perfect and a few births may not have been registered. Apart from these minor problems, the published fertility data for Arabs in Israel can be accepted as accurate.

Table 2.3 shows Muslim and Christian age-specific fertility rates in 1965 and relative levels of fertility in subsequent years. The figures in this table reveal the similarities in the changes in Muslim and Christian fertility levels at different ages. In both communities,

Table 2.4 Mean number of children ever-born to selected groups of women by population group, Palestine, Israel and the Occupied Territories

		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Mean number of children ever-born to currently married women								
Muslims								
Israel	1961*	0.9	2.3	4.0	6.0	7.5	7.5	8.0
	1972*	0.9	2.2	4.1	6.1	7.9	8.8	9.2
	1983*	0.7	1.8	3.5	5.3	6.8	7.7	8.6
Jerusalem	1967	0.9	2.8	4.5	6.1	7.7	9.0	9.7
	1983*	0.8	2.1	3.8	5.4	6.8	7.7	7.8
West Bank	1967	1.0	2.5	4.2	5.9	7.5	8.5	8.9
Gaza Strip	1967	1.1	2.3	4.0	5.6	7.1	8.1	8.7
Christians								
Israel	1961*	0.6	1.8	3.3	4.1	5.2	5.9	6.5
	1972*	0.6	1.5	2.5	3.9	5.0	5.6	6.4
	1983*	0.9	1.3	2.3	3.2	3.9	4.2	4.6
Jerusalem	1967	0.9	1.7	2.7	4.4	5.0	6.1	6.0
	1983*	(2.4)	1.5	2.0	2.7	2.9	3.1	3.7
West Bank	1967	1.0	2.5	4.2	3.7	5.7	6.7	4.9
Mean number of children ever-born to all women								
Arabs+								
Jerusalem	1967	0.2	1.7	3.4	4.8	6.5	7.5	8.0
West Bank	1967	0.2	1.5	3.4	5.2	6.9	7.9	8.3
Gaza Strip	1967	0.2	1.4	3.6	5.2	6.8	7.7	8.2

* Women in their first marriage; + Date not available for Muslims and Christians separately.
( ) Small numbers.

Sources: Israel, CBS (1968a), (1968b), (1987a), (1994a)

fertility fluctuated during the late 1960s. Among women under age 25, fertility dropped by about 20 per cent between 1965 and 1968 and then recovered to around the 1965 level in 1969. The secondary peak for older women was one year earlier. In both communities, the declines in the levels of childbearing among women aged 20-34 after the end of the 1960s were smaller than the declines at ages 15-19 and 35-49.

Measures of family size are presented in Table 2.4. These complement the information on period fertility and highlight the variations between areas and over time. The figures in the table are mean numbers of children ever-born to currently married women not the commonly encountered mean parities for all women. This is because the only available data for the Israeli population are for currently married women in their first marriage. The patterns indicated by the data for Israeli Palestinians are discussed alongside those for the Occupied Territories in the next section.

2.2.3 The West Bank and Gaza Strip

The Israelis conducted only one census in the West Bank and Gaza Strip in 1967.

Jerusalem

In 1972, the estimated total fertility rate for Muslims in Jerusalem was 7.5. By 1983, it had fallen to 4.9 (Schmelz, 1987, p.80). The comparable figures for Christians are 2.8 and 1.8. There are no available data on age-specific fertility rates for Jerusalem. Mean parities for currently married women are available for 1967 and 1983 (Table 2.4). They show that mean parities in 1967 were higher than in 1983 for all ages and both religions, and that Muslims in Jerusalem had higher mean parities than Christians. Muslims in Jerusalem had a higher completed family size in 1967 compared to Muslims living in Israel, but a smaller completed family size in 1983. At other ages, Muslim mean parities were broadly similar, with a slight suggestion of earlier childbearing in Jerusalem. On the other hand, Christians living in Jerusalem had consistently lower mean parities at all ages over 24 than Christians living in Israel.

West Bank (excluding Jerusalem) and Gaza Strip

The only estimate of the total fertility rate for the West Bank (including East Jerusalem) before 1967 is derived from the 1961 Jordanian census. According to Hill (1982, pp.47-48):

> The reported average parity for all West Bank women aged 45-49 in 1961 was 7.47, close to the estimated total fertility rate estimated by applying the Brass P/F ratio correction to the registered births tabulated by age of mother for the years surrounding the census.

No comparable data were collected for the Gaza Strip during the Egyptian era.

Figure 2.1 plots the Israeli Central Bureau of Statistics' estimates of total fertility in the Gaza Strip and West Bank (excluding Jerusalem) in the years 1968-84. The age-specific rates are computed from registered births and estimates of the number of women. The latter are derived from projections of the 1967 population and estimates of deaths and migrations. (See Schmelz *et al.*, 1977, pp.38-40 for a discussion of the inherent weaknesses of the population estimates.) The trends for the two areas are similar. The figures for the Gaza Strip reveal that total fertility increased from a low of 6.9 in 1968 to a peak of 8.0 in 1974 and decline by about 10 per cent over the course of the next decade. In the West Bank the increase was more moderate, the fall slightly larger, and the annual variations less erratic.

The Gaza Strip and West Bank age-specific fertility rates are shown in Table 2.5. The most striking feature of these data are the low levels of fertility among women aged 15-19 an 20-24 in both the West Bank and the Gaza Strip following the war in 1967. The Central Bureau of Statistics acknowledges that a small number of births in the Occupied

Table 2.5 Age-specific and total fertility rates, Gaza Strip and West Bank, 1968-87

	1968-72	1973-77	1978-82	1983-87
Gaza Strip				
15-19	0.052	0.096	0.093	0.091
20-24	0.228	0.292	0.291	0.300
25-29	0.349	0.375	0.329	0.311
30-34	0.354	0.337	0.349	0.333
35-39	0.327	0.298	0.241	0.256
40-44	0.106	0.104	0.108	0.094
45-49	0.050	0.035	0.027	0.023
Total fertility	7.3	7.7	7.3	7.0
West Bank				
15-19	0.076	0.128	0.089	0.083
20-24	0.283	0.308	0.261	0.245
25-29	0.366	0.420	0.355	0.271
30-34	0.336	0.319	0.343	0.311
35-39	0.308	0.277	0.254	0.255
40-44	0.123	0.086	0.103	0.113
45-49	0.051	0.018	0.021	0.022
Total fertility	7.7	7.8	7.1	6.5

Source: Israel, CBS (1996), p. (48).

Territories are not registered (Israel, CBS, 1983, p.122). However, this is not the sole explanation for the unusual age-specific fertility patterns. These are discussed further in the following and later sections of this study.

Reported average parities for currently married and ever-married women age 15 to 49 at the time of the 1967 census are also shown in Table 2.4. The average number of children ever-born to married Muslim women who reached the end of the reproductive period before the mid-1970s is at least eight births. The estimated number for all women is no less than seven. For currently married Muslim women the average parities are slightly lower than for Jerusalem. The figures for West Bank Christians are erratic but the general pattern suggests that these women had larger families than Jerusalem Christians.

There are only two other estimates of fertility for the Occupied Territories in the period up to 1985. The estimated total fertility rate in three West Bank villages in the early 1980s was 8.7 births (total number of women aged 15-49 = 488) (Giacaman, 1988, p.94). An even smaller study carried out in 1985 reported mean parities of currently married women in the Khan Yunis area of the Gaza Strip as 10.7 for women married for 25-29 years (n=20) and 10.5 for those married for 30 years or more (n=34) (Dahlan, 1987, p.163).

2.3 Context and explanation

Fertility differentials and changes in fertility levels reflect variations in social and cultural norms and economic, environmental, and political forces. These factors are termed underlying or distal determinants of fertility. They operate through a limited number of behavioural and biological factors that exert a direct influence on reproduction. In an early and significant paper, Davis and Blake (1956) classified the behavioural and biological factors and proposed a framework for analysing the determinant of fertility. The next generation of researchers, led by John Bongaarts, focused on incorporating a refined set of these behavioural and biological or proximate fertility determinants into a quantitative model. In Chapter 7, the Bongaarts model is applied to the data for Gaza city. The current section adopts the same broad approach in an attempt to explain the fertility patterns observed for the other Palestinian populations. The first part examines the available data and the literature on the proximate determinants. This is followed by a discussion of the social and other major changes that have affected the populations.

2.3.1 Proximate determinants of fertility

Bongaarts and colleagues established that four proximate determinants account for most of the variation in fertility levels between populations and over time (see Bongaarts, 1978 and Bongaarts and Potter, 1983, and references therein). These are the proportion of the reproductive period spent in marital or sexual union, postpartum infecundability, contraceptive use and prevalence of induced abortion. In contrast, normal variations in two other factors, intra-uterine mortality and permanent natural sterility, are small. Bongaarts' seventh and last proximate determinant is fecundability, which is directly related to the frequency of intercourse. For women in stable unions who menstruate regularly the waiting time to conception is seven months plus or minus two or three months (Bongaarts and Potter, 1983, p.46). But in populations where fecundability is reduced substantially by prolonged spousal separations or where postpartum sexual abstinence extends beyond the period of lactational infecundability, it is necessary to estimate the effect of these factors. The second contribution made by Bongaarts was to devise a model for calculating the fertility-inhibiting effects of the four most important proximate determinants. The data required to make a quantitative assessment of the impact of these four determinants on fertility in Palestine, Israel and the Occupied Territories do not exist. But there is some evidence to indicate how certain of these

determinants varied over time. Marriage appears to be by far the most variable determinant, but changes in breast feeding, contraception and other proximate determinants are also discussed.

Marriage

In all Middle Eastern countries, the time spent in marriage is largely determined by the ages at which women marry and the proportion of women who ever marry. Data on these two aspects of nuptiality for the Palestinian populations are presented in Table 2.6. The 1931 Census results for urban Muslim women indicate that 48 per cent of women aged 15-19 and 85 per cent of women aged 20-24 were, or had been, married. The expected pattern of earlier marriage in rural Palestine is confirmed by the statistics for the five southern villages that were surveyed in 1944. In these communities, 11 per cent of women aged 18-22 years were single and only 3 per cent of women aged 33 or more had never married. Further evidence of early marriage in Palestine is provided by data from the 1961 Israeli Census. Only 2 per cent of Muslim women aged 45-54 in 1961 (aged 15-24 in 1931) had never married (Israel, CBS, 1962, p.33). Moreover, among women in their first marriage who had married in the period prior to 1946, 49 per cent had married before age 18 and only 24 per cent were still single at their twenty-second birthday (Israel, CBS, 1964, p.39). The figures that diverge widely from all these findings are the 1931 Census results for the rural population. For example, according to the Census, only 28 per cent of Palestinian village women aged 15-19 were married. Since it is highly unlikely that at that time rural women were marrying later than their urban counterparts, and because the reported ages of young married women were systematically exaggerated in the Census (see Appendix A), the 1931 data for young rural Muslim women in Table 2.6 can be disregarded.

The main findings revealed by the data for Muslims are that the female age at marriage increased after 1931 but also that, throughout the period covered by the data, marriage was almost universal. The singulate mean age at marriage for Israeli Muslims in 1961 was at least 2.3 years higher than the corresponding figure for all Palestinian Muslims in 1931. Between 1961 and 1972 the singulate mean age at marriage increased by 0.4 years. The fertility-inhibiting effect of the rise in the age at marriage before 1955 cannot be quantified because of the lack of reliable fertility measures. From 1955 to 1970, an increase in the age at marriage probably exerted a small downward influence on fertility but this is obscured by the countervailing impact of other factors. The significant

Table 2.6 Percentage of women ever-married by age and singulate mean ages of marriage (SMAM) by 45, Palestine, Israel and the Occupied Territories

		15-19	20-24	25-29	30-34	35-39	40-44	45-49	SMAM
Muslims									
Palestine 1931:	Total	34	78	93	97	97	98	98	19.5
	Urban	48	85	93	96	96	96	96	18.3
	Rural*	28	76	93	97	98	98	98	20.5
Age group:		*13-17*	*18-22*	*23-27*	*28-32*	*33-37*	*38-42*	*43-47*	*48-52*
5 villages 1944		12	89	99	95	97	98	98	100
Israel:	1961	22	74	91	96	98	98	98	20.6
	1972	23	69	87	93	95	96	97	21.0
	1983	14	58	82	90	93	94	96	22.4
Gaza Strip	1967	14	62	91	95	97	97	99	21.8
West Bank	1967	20	61	85	92	95	97	97	21.9
Jerusalem	1967	24	68	86	88	94	95	95	21.0
Jerusalem	1983	22	63	85	89	90	91	94+	21.3
Christians									
Palestine 1931:	Total	19	56	73	78	81	80	81	21.0
	Urban	18	54	70	76	79	78	80	21.1
	Rural	24	64	82	85	86	85	84	20.0
Israel:	1961	9	53	74	83	87	87	86	22.4
	1972	9	49	73	80	83	84	86	22.8
	1983	6	44	76	82	84	84	85	22.8
West Bank	1967	11	46	69	77	87	90	83	23.9
Jerusalem	1967	5	33	63	67	84	84	86	25.3
Jerusalem	1983	5	36	62	71	71	68	69+	22.7

* Data for young ages are implausible – see text; + Ages 45-64.
Sources: Mills (1933b); Palestine, DS (1945); Israel, CBS (1964), (1968a), (1968b), (1975), (1985); Schmelz (1987).

fluctuations in the age-specific fertility rates for women under age 25 during the period 1955 to 1969, do, however, provide evidence that nuptiality patterns and childbearing are associated. Between 1955-59 and 1960-64 the crude marriage rate for Muslims rose from 7.0 to 8.3 marriages per thousand population (Israel, CBS, 1972, SAI, p.76) and, as Table 2.1 shows, the fertility of women under age 25 increased by 10 per cent. In 1965 the crude marriage rate was 7.6; by 1967 it had fallen to 6.4; and in 1968 it increased to 8.0 marriages per thousand population (calculated from Israel, CBS, various years, SAI, JIIS, various years and Schmelz, 1987). These changes are reflected in levels of childbearing 12 months later. Between 1965 and 1968, the age-specific fertility rate for women aged 15-19 fell by about 40 per cent and the rate for women aged 20-24 declined by about 12 per cent (see Table 2.3). Then, in 1969 after the marriage rate rose, the numbers of births to women in these age groups increased abruptly and the level of fertility exceeded that

which prevailed in 1965. This period of fluctuations was followed by two decades of gradual change. By 1983, the singulate mean age at marriage had risen to 24.3. Most of the 60 per cent drop between 1969 and the late 1980s in the fertility rate for women aged 15-19 and at least half of the 40 per cent reduction in the rate for women aged 20-24 can be accounted for by postponement of marriage.

The data in Table 2.6 reveal that the key to understanding Palestinian Christian fertility in the 20th century. The feature that distinguishes them from Palestinian Muslims, is their pattern of delayed marriage and never marriage. In 1931, only 19 per cent of Christian women aged 15-19, 56 per cent of women aged 20-24 and 73 per cent of women aged 25-29 had married. More significantly, 20 per cent of women over age 30 were single. These figures for all Christians include Europeans and the populations of the large religious institutions in the towns, but nuptiality patterns in the rural Christian communities were similar. Thus, 15 per cent of rural Christians over age 30 had never married and, among those who did marry, the average age at entry into marital union was about two years later than that for Muslims. Variations in marriage patterns account for a large proportion of the differences between the fertility level prevailing in Palestine in the 1930s and 1940s and the level of childbearing among Christians in Israel in 1955-65 (Figure 2.1). In 1961, less than 10 per cent of women aged 15-19 had married and the age-specific fertility rate for this age group in the mid 1950s was lower than the rates in the 1940s (Table 2.1). Conversely, there were fewer single Christian women over 30 in Israel in 1961 than in Palestine in 1931 and the fertility of women aged 30-49 was higher than during British rule.

The nuptiality patterns of both Muslims and Christians in the Occupied Territories differ from those described for Palestinians in Israel in ways that have significant implications for the understanding of the contrasting fertility levels and trends of the populations. Marriage at young ages was less common in Jerusalem, the West Bank and the Gaza Strip in 1967 than it was in Israel in 1961 and, except for the Gaza Strip, the proportions never married were higher. The impact of delayed entry into marriage on fertility is suggested by the relatively low levels of childbearing among young women in the Occupied Territories at the end of the 1960s. Commenting on the changes in fertility levels in the West Bank and Gaza Strip in the years 1968-75, Schmelz *et al.* (1977, p.51) note, '[the] rising rates for women "up to 19" and "20-24", in conformance with the normalization tendency operating in the marriage market and through the reunion (in or outside the Areas) of married couples.' In addition to contributing to the increase in

childbearing between the late 1960s and the early 1970s, changes in marriage patterns in the West Bank and Gaza Strip also explains some of the difference in fertility levels between these areas and Israel at the end of the 1960s. What is not clear from Schmelz *et al.*'s statement, however, is whether they regard the 1967 Census marital status data as atypical in any way. Since the Israelis did not conduct another Census in the West Bank and Gaza Strip after 1967, the only other marital status data available for the Occupied Territories are those for Jerusalem. The published 1972 data for Jerusalem are for all Arabs and indicate a singulate mean age at marriage of 21.2 (Israel, CBS, 1975, p.147). This is half a year younger than the singulate mean age at marriage for all Arabs in the city in 1967. Thus, the apparent stability in the marriage patterns of women under age 35 which is indicated by the 1967 and 1983 data for Jerusalem in Table 2.6, mask variations over time that were either due to real fluctuations or to selective migration. The Jerusalem results, together with the fact that in 1967 marriage in the Occupied Territories was later than in Israel in 1961, suggest that some transient factor may have been operating to raise the age at marriage in 1967. The published data do not permit the investigation of such a possibility but, if correct, it could have significant implications for understanding post-1967 fertility trends in the Occupied Territories. The chapters on the Gaza city population address this issue.

Childbearing is curtailed when a woman is divorced or widowed but may resume in the event of remarriage. Few marriages in Palestine were dissolved by divorce and Muslim divorcees frequently remarried. In the Muslim village of Artas near Bethlehem, for example, only 6 per cent of the ever-married women who were alive in 1927 had experienced divorce and all had remarried (calculated from Granqvist, 1935).[1] Less than 1 per cent of Christian and Muslim women enumerated in the 1931 census were currently divorced. In contrast, as the illustrative figures presented in Table 2.7 show, differentials did exist in the proportions living as widows in 1931. The presence of European missionaries and social workers is the most likely explanation for the very high proportion of Christian widows living in the towns. On the other hand, variations in remarriage rates probably account for both the urban-rural differential for Muslims, and, assuming that rural Christian life expectancy exceeded that for Muslims, the similarity in

[1] The most comprehensive description of peasant life is found in the work of anthropologist Hilma Granqvist who lived in the village of Artas (near Bethlehem) for three years between 1927 and 1931. (See: Granqvist, 1931, 1935, 1947 and 1950).

Table 2.7 Percentage widowed of women aged 35-44 and time spent in marriage, Palestine, Israel and the Occupied Territories

		Percentage widowed at ages 35-44			Time spent in marriage – I_m		
		Muslims	Christians	Arabs	Muslims	Christians	Arabs
Palestine 1931:	Total	12	16	12	0.791	0.592	0.766
	Urban	15	18	16	0.804	0.566	0.733
	Rural	11	11	11	0.784*	0.680	0.779*
5 villages 1944		12	-	11	0.854	-	0.854
Israel	1961	8	5	7	0.775	0.638	0.744
	1972	6	4	5	0.759	0.619	0.733
	1983	4	3	3	0.705	0.612	0.691
Gaza Strip	1967	7	-	7	0.737	-	0.735
West Bank	1967	7	3	6	0.723	0.621	0.718
Jerusalem	1967	7	9	7	0.738	0.524	0.697
Jerusalem	1972	-	-	8	-	-	0.682

* Underestimate – see Table 2.6 and text.

Sources: Mills (1933b); Palestine, DS (1945); Israel, CBS (1964), (1968a), (1968b), (1975), (1985)

the proportions of rural Christian women and rural Muslim women who were living as widows in 1931. Although there are no data on the frequency of remarriage in the towns of Palestine, evidence does exist to support the assertion that it was common in Muslim villages. For example, in the Five Southern villages in 1944, remarried widows and divorcees comprised 8, 23 and 30 per cent of currently married women aged 28-32, 38-42 and 48-52 respectively (Palestine, DS, 1945, p.445).

When other factors remain unchanged, a reduction in widowhood results in a rise in the fertility of older women. Adult life expectancy increased both during the Mandate and after the British left Palestine. The low proportions of widowed women in Israel and the Occupied Territories are consistent with improvements in adult survival (although, as of 1967, the holy city of Jerusalem was still attracting more than its share of Christian widows). Some of the difference between the fertility of older Christian women in Palestine in the 1940s and in Israel in the period 1955-65 may be attributable to the reduction in the time spent in widowhood. Of particular interest, however, is the extent to which extended adult survival affected Muslim fertility trends in Palestine. This is important because it is cited by Bachi (1977, p.201) as one of the contributing causes of what he believed was a very large increase in the total fertility rate.[2] The estimated life

[2] Bachi's own words are: 'With regard to (b) [the increase in the total fertility rate from 6.4 in 1926-27 to 9.4 in 1943-45] the following explanation can perhaps be offered. In the course of the past half century

expectancy of Muslim men increased from 37.1 in 1926-27 to 46.1 in 1939-41; the figures for women are slightly higher (Bachi, 1977, p.248). As Chapter 3 indicates, much of the improvement was in child survival. Moreover, some of the fertility-enhancing impact of the reduction in widowhood would have been offset by the extended duration of breast feeding and associated postpartum infecundability. As a rough estimate, the increase in the total fertility rate produced by the estimated improvement in life expectancy is unlikely to have exceeded 0.7 births.[3]

A broad indication of the proportion of the reproductive period spent in marriage is given by Coale's index of marriage – I_m. This summary measure has been calculated for each of the Palestinian populations and the results are presented in Table 2.7. The indices highlight the differences between the marriage patterns of Palestinian Christians and Muslims, which have persisted over at least half a century. The trends indicate that increases in the age at marriage have more than compensated for the reduction of time spent in widowhood. More generally, the weak association between the I_m values and the observed levels of childbearing suggests that other proximate determinants have also had a significant influence on Palestinian fertility.

Breast feeding

When compared with the physiological maximum, the level of Palestinian marital fertility is low. The intermediate mechanism responsible is lactation-induced postpartum infecundability. In the first half of the twentieth century, extended breast feeding was the

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the Moslem population of Mandatory Palestine and Israel achieved an enormous progress in its health conditions: strong reduction in mortality of women at reproductive ages, and eradication of malaria, which was formerly widespread in the country, were among the most outstanding features. Moreover a considerable economic improvement took place. These developments occurred in a predominantly rural and tradition-bound society, in which high fertility was greatly esteemed, and the nuclear families were integrated in clans. These factors brought about an increased fertility.' (Bachi, 1977, p. 201)

[3] This figure is derived from those produced by the computer simulation models of Ridley *et al*. (1967, p.89). Their calculations were repeated for durations of postpartum infecundability of 20.9 months and 6.5 months. In the case of the former, the total fertility rate at levels of mortality (UN Model Life Tables) of e_0 =31, 41, and 51 are 6.2, 6.3 and 6.2. The corresponding values for the short period of amenorrhoea are 8.5, 8.8 and 9.2. Both sets of calculations assume that about one quarter of widows remarry. Since Muslim remarriage was probably no lower than this and postpartum infecundability no shorter than 6.5 months, a rise in the total fertility rate of 0.7 births can be regarded as the maximum value of the health-related increase in natality.

norm among Muslims in Palestine: at least two years was usual according to Mills (1933a), no less than 18 months and often three years according to Canaan (1927a). In the Bethlehem village of Artas the anthropologist Hilma Granqvist was told, 'The boy is suckled two and a half years and God does not reward thee, and the girl is suckled one and a half and God rewards thee.' (Granqvist 1947, 108). Women would, when necessary, wet nurse infants whose own mothers were unable to suckle them. Breast feeding was probably also common among Christians. This can be inferred from Canaan's observation that amulets made of white stones from the milk grotto in Bethlehem were used by both Muslims and Christians in the town and surrounding district in the hope of increasing the flow of breast milk (Canaan, 1927b). Granqvist noted with regret the first appearance of the feeding bottle and teat in Artas in 1931. Given the proximity of Artas to Bethlehem and Jerusalem, both centres of European influence, it can be assumed that any change from breast to bottle feeding during the latter years of the Mandate could not have caused much, if any, reduction in the fertility-inhibiting effect of lactation in the villages of Palestine.

In non-contracepting populations, shortened or less-intensive breast feeding is the most common cause of increases in marital fertility. For the period prior to 1980, there is no pertinent information on breast feeding practices in Israel and the Occupied Territories. The evidence that changes in breast feeding had an impact on Palestinian fertility is, however, substantial. Table 2.8 shows data, which were collected, in a survey that was conducted in Israel and the Occupied Territories in 1973-75. The data are taken from Friedlander, Eisenbach and Goldscheider (1979). The survey did not cover the population of Jerusalem. The figures are the cumulated mean parities for synthetic cohorts of currently married women in their first marriage at completed durations of marriage. Reading across the rows in the first panel of the table reveals that Israeli urban Muslim marital fertility increased steadily at all durations of marriage up to 1960-64. Up to the late 1950s, the increases in fertility in rural areas were slower than in the towns. In contrast, in the Occupied Territories, the pace of childbearing within marriage appears to have been less rapid and rather stable until the early 1960s when a period of accelerated childbearing at young ages began. The most plausible explanation for these variations in fertility trends is differential timing in reductions from relatively long to relatively short durations of breast feeding. Moreover, it seems likely that the decline in the duration of breast feeding was a significant factor in the rise in the Israeli Muslim total fertility rate between 1955 and 1964. Shortening of the duration of breast feeding in the city of

Table 2.8 Cumulative cohort fertility by duration of marriage, Israel by population group and the Occupied Territories

Exact duration of marriage	Calendar year at completion of duration						
	1940-44	1945-49	1950-54	1955-59	1960-64	1965-69	1970-74
Israel							
Urban Muslims							
5 years	1.78	1.92	2.12	2.28	2.65	2.51	2.61
10 years		3.42	4.12	4.25	4.50	5.01	4.72
15 years			5.22	5.72	6.81	6.33	6.48
20 years				7.22	7.40	8.39	7.63
25 years					8.58	8.32	9.46
30 years						9.19	8.54
Rural Muslims							
5 years	1.30	1.85	2.02	2.18	2.57	2.64	2.75
10 years		3.06	3.76	4.28	4.67	5.02	5.10
15 years			4.78	5.91	6.46	6.97	7.01
20 years				6.46	7.89	8.14	8.60
25 years					8.02	9.19	9.03
30 years						8.83	9.58
Urban Christians							
5 years			2.19	2.30	2.37	2.03	2.22
10 years				4.08	4.07	3.70	3.43
15 years					5.28	5.18	4.35
20 years						5.85	5.64
25 years							5.98
Occupied Territories, all women							
5 years	1.86	1.87	1.85	1.87	1.92	2.07	2.33
10 years		3.90	4.00	3.82	3.80	4.19	4.41
15 years			5.80	5.91	5.56	5.83	6.21
20 years				7.50	7.58	7.17	7.56
25 years					8.81	8.83	8.31
30 years						9.45	9.31

Source: Friedlander, Eisenbach and Goldscheider (1979), pp. 242-243.

Jerusalem may also explain the very large completed family size of Jerusalem Muslims in 1967.

Contraceptive use

Some tentative inferences about the use of contraception in Palestine during the Mandate can be made from two essentially negative comments. Only on one occasion, in the context of child mortality, does Granqvist use the term birth control:

> Even where there is no birth-control to reduce productivity nature itself regulates the matter... Nature allows a large number to be born because under the prevailing severe conditions many of them will die early. (Granqvist, 1950, p.81.)

The suggestion that family planning was being practised in urban areas comes from a report written by the Superintendent of the Census (Mills, 1939, p.11):

> The statistics[4] [for Muslim couples] reflect no use of contraceptive methods. This result is in accordance with expectation seeing that the sample is of marriages going back to 1899. It is the fact, however, that contraceptive methods have been employed in recent years by Moslems living in the towns.

It seems reasonable to assume from the contrast implicit in the phrasing of Mills' statement that contraceptive use was relatively common among Palestinian urban Christians.

Palestinian populations in which married women over age 40 in 1961 had experienced more than 7 births are very unlikely to have been limiting the sizes of their families before 1950. As the numbers of children ever-born to currently married women in 1961 in Table 2.9 and the marriage cohort data in Table 2.8 indicate, urban and rural Muslims and rural Christians all fall into this category. While some urban Christians were probably using contraception in the 1930s and 1940s, there are no published data that can clearly confirm that this was the case among those who stayed in the towns which came under Israeli rule.

In contrast to the period prior to 1950, data on contraceptive use are available for the Arab population of Israel. The 1973-75 Israeli survey included questions on family planning. About 35 per cent of the survey's Muslim respondents and 50 per cent of Christian women reported that they had ever done something to avoid a pregnancy (Eisenbach, 1986). The detailed results for Christians have not been published but those for Muslims leave no doubt that the decline in marital fertility was achieved largely by the use of modern methods of contraception (Eisenbach, 1986). By the mid 1970s, 20 per cent of Muslim women who had married before 1948 had used contraception and the proportion of ever-users increased to 39 per cent among women who married between 1959 and 1968. Women who had married before 1948 were more likely to have ever-practised withdrawal and their reported use of intrauterine contraceptive devices was lower than among later marriage cohorts, but there were no significant differentials by cohort in ever-use of the contraceptive pill.

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[4] At the end of 1931 a non-random sample of currently married couples in their first marriage were asked for details of the duration of cohabitation, total number of live and stillbirths and deaths of children under five. For Muslims the average number of live births at durations of 25-29, 30-32 and 33+ years are 8.0, 8.6 and 8.4. The only figures given for Christians and Jews are for marriages which lasted at least 33 years. These are 7.9 for Christians, 6.3 for Eastern Jews and 6.7 for Western Jews (Mills, 1939).

Table 2.9 Mean number of births to currently married Muslim and Christian women in their first marriage, by age and locality, Israel 1961

Age group	Muslims			Christians (including Europeans)		
	Mixed towns*	Nazareth & Shafr 'Amr	Villages	Mixed towns*	Nazareth & Shafr 'Amr	Northern villages
15-19	*x*	*x*	0.8	*x*	*X*	*x*
20-24	2.1	2.4	2.4	2.0	1.8	1.8
25-29	3.4	4.6	4.2	3.0	3.3	3.7
30-34	5.8	6.6	6.2	4.3	4.9	4.5
35-39	(6.8)	7.0	7.9	(6.0)	5.2	7.2
40-44	(7.7)	(9.7)	7.8	(5.7)	6.3	8.0
45-49	(6.3)	(8.2)	8.3	(6.4)	(6.5)	8.4
50+	6.4	8.2	7.5	6.1	7.0	7.1
Number of women	1820	2055	17420	3025	2580	2920

* Towns with large Jewish populations: Tel-Aviv-Jaffa, Haifa, Acre, Ramleh, Lydda, Jerusalem.
x and (): small numbers.
Source: Israel, CBS (1966), p. 72.

The impact of contraceptive use on fertility is suggested by the cumulated mean parities from the 1973-75 survey (Table 2.8). These data indicate that the beginning of the decline in marital fertility at extended durations of marriage - 15 years among urban Muslims and 20 years among rural Muslims - occurred between the early and late 1960s. The change from uncontrolled to controlled marital fertility was not, however, gradual. The evidence for this is the figures in Table 2.3 which show that, between 1965 and 1967, the level of fertility among women over 25 fell by 14 per cent then, in 1968, it increased by about 10 per cent. Only after 1969 did fertility decline steadily in all age groups between 25 and 49.

Christians in Israel started to control their family sizes earlier than Muslims. In 1960-64, urban Christians who had been married for 15 years had experienced 5.3 births on average. The small number of rural Christians in the 1973-75 survey precludes the publication of detailed data for this community, but, after 15 years of marriage, the cohort who had married in 1950-59 had given birth to an average of 5.9 children (Friedlander, Eisenbach and Goldscheider 1979). These figures compare with that of over 7 births for Muslims who had been married for the same length of time (Table 2.8). More striking than this difference between the Christians and Muslims, however, is the similarity in the fluctuations in fertility levels at the end of the 1960s. As the data in Table 2.3 indicate, the level of fertility among Christian women over age 25, like that of their Muslim counterparts, declined between 1965 and 1967, increased in 1968, and then fell steadily

after 1969. The social and economic changes, which may account for the fluctuations and subsequent declines in fertility levels, are discussed in Section 2.3.2.

There are no data on contraceptive use in the Occupied Territories for the period prior to the 1980s. In the city of Jerusalem, however, family planning has a relatively long history. Private medical practitioners were the first to supply couples with modern methods of contraception. The opening of the first branch of the Jordanian Family Planning and Protection Association (the name of the local International Planned Parenthood Federation affiliate) in Jerusalem in 1963 merely ensured that effective methods for birth spacing and family limitation were accessible to all. As noted in Section 2.2.3, in 1972 and 1983 the levels of fertility in the Jerusalem Muslim and Christian populations were lower than among their counterparts in other areas of Palestine. Easy access to contraception may be part of the explanation for this finding but the large variations in the level of childbearing between different areas of the city suggest that other factors are more important. The fertility differentials, and the association between them and socio-economic factors, are examined in Section 2.3.2.

Other proximate determinants

In their 1979 article Friedlander, Eisenbach and Goldscheider state that Muslim fertility very probably increased during the 1930s and 1940s. According to these demographers:

> Such fertility increases have been noted in other areas in association with general improvements in standards of living, particularly with improved health services. Such changes may lead to lower rates of pregnancy wastage, increases in fecundity, and hence to increased marital fertility. (Friedlander, Eisenbach and Goldscheider, 1979, p.244.)

This suggested cause of fertility increase is unconvincing and is not consistent with the findings of the research brought together by Bongaarts and Potter. These show that populations with widely different levels of child and adult mortality have very similar intra-uterine mortality rates and, whereas acute starvation is associated with sub-fecundity, chronic moderate malnutrition is not (Bongaarts and Potter, 1983, pp.16-17 and 40). There is an inverse relationship between the stillbirth rate and living standards (Macfarlane and Mugford, 1984, p.140). But even a reduction in the number of stillbirths per thousand live births from, for example, 50 to 25 would result in an increase in the birth rate of less than two per cent.[5]

[5] The reported number of stillbirths per thousand live births for Jews in a varying number of towns ranges between 38 in 1926 and 21 in 1944 (Palestine, DS, 1947, p.27). The lower rates for Muslims and Christians presumably reflect less complete registration.

2.3.2 Distal determinants of fertility

In the early part of the 20th century when the first demographic data became available, Palestinian society had clearly not entered the demographic transition to low fertility and mortality. In Paul Demeny's words, 'In traditional societies fertility and mortality are high. In modern societies fertility and mortality are low. In between, there is demographic transition.' (Demeny, 1968, quoted in Coale, 1973, p.64) This section seeks explanations for this transition related to family structure, socio-economic change, women's education and status, and political developments.

Family structure in Palestine

Throughout Ottoman rule and during the British Mandate, Palestinian village society was organised along kin lines. The unit of production was the family which was patriarchal, hierarchical, and extended. The political power and prestige of the kin unit was derived from the amount of land that they controlled as this represented the principal source of economic wealth. The survival of male family members was critical:

> ... in the spread and perpetuation of the family name, in the holding of property and in defending the interests of the clan, it is the sons who count as an asset. (Canaan, 1931, p.174.)

Young and old of both sexes shared the burden of agricultural work but men attached limited value to the productive wealth of women.

> Women perform the lowliest duties. Thus in villages grinding wheat is done by women,..... women fetch the water, ...(Canaan, 1931, p.181).

Sons gradually took over the most strenuous tasks from their fathers and physically inactive parents were totally dependent on the next generation of men.

Women contributed to kin status and wealth in two more important ways. Male honour, '*ird*, was vested in the chaste behaviour of their kinswomen (daughters, sisters, wives), and women gained status and derived respect from bearing children (Granqvist, 1931). In this patrilineal, patrilocal society, the benefits from the latter accrued to the woman's husband and his kin group. Most girls were married shortly after they reached menarche.[6] The bride's natal family was eager to relieve themselves of the potential

[6] The peasants did not reckon ages in calendar years. Rather, as Granqvist's list, which is reproduced in Appendix B, shows, descriptive phrases defined broad age groups. Significantly, the terms for pre-pubescent boys and girls refer to the tasks assigned to them but those for women describe the different stages of family formation.

source of shame which a pubescent girl represented and the bridegroom's family were keen to procure a young bride:

> The young girl gradually grows into the customs and views of her husband's family; one need not fear that she will come in with her own ideas and wishes if she has in her early years lived under the disciplining hand of her mother-in-law, who has moulded her according to her own desire; by this means the housekeeping proceeds in the old way. (Granqvist, 1931, p.44.)

Islamic law stipulates that the *mahr* or bridewealth be paid entirely to the bride. In practice, a woman's agnatic kin frequently appropriated the greater portion for themselves, as compensation for costs incurred and to offset potential future costs. This was justified by the argument that the woman's father or brothers were obliged to support her in the event of divorce or early widowhood. For the same reason, a woman often did not receive her rightful inheritance. Hence, the economic dependence of women on men was institutionalised. Female authority was limited to the woman's sphere - the household and particularly the upbringing of children. The lives of village Christian mothers were no different. Men were similarly dependent on the patriarch, since rights of access to the means of production were primarily inheritable.

Socio-economic change

The economic transformation of Palestine, initiated under the Ottomans continued unabated under British rule (Abu-Lughod, 1971 and Smith, 1984). As a result of increased taxation and monetisation of the economy, a growing proportion of the peasantry became indebted to the village money-lenders. Others lost their land. The buying up of land by the Jewish Agency for exclusive settlement by Zionist colonists exacerbated the problem. Many families were forced to migrate or send their sons to work in nearby towns. The proportion of the Arab population living in towns and cities increased from 30 per cent in 1931 to an estimated 36 per cent in 1944 (see Table 1.3).

Little information exists on urban social institutions during this period. Even less is known about the impact of economic and political changes on prevailing customs. However, in small and large towns many commercial activities were extended family enterprises. For the urban poor, eking out a livelihood was probably as arduous as in the countryside. Where circumstances necessitated it, women (and also children) sought work outside the home. Opportunities were limited. The employment of unskilled female labourers in large industrial establishments was rare, but the fortunate found poorly-paid work as domestic servants in the homes of the upper and middle classes.

Tamari and Scott (1991) document the changes experienced by the Israeli Arab population since 1948. Among the most fundamental were the confiscation of land and the transformation of peasants into wage labourers, a substantial reduction in child mortality, and state intervention in family affairs (national insurance, child allowances and pensions). There was also a rapid expansion in education. It is evident from the mean parity data in Table 2.10 that couples with husbands engaged in the highest status occupations, who are not necessarily the most wealthy, were the first to limit the size of their families. The salaries of these men enabled the families to maintain their standard of living without becoming dependent on sons' contributions to the household budget. They could also rely on their pensions to guarantee their financial independence after retirement. Given their educational advantage, which dates back to the period of British rule (Table 2.11), it is not surprising that it was Christian men who were the most successful at gaining professional and white collar employment (see Table 2.12).

Referring to Figure 2.1, it is clear that sustained fertility decline in Israel began at the end of the 1960s. For most Palestinians, the most dramatic change that occurred during this period was the recession in the Israeli economy. Unemployment among Arab men increased from 4 per cent in 1965, to 13 per cent in 1966 and 19 per cent in 1967 (Ben-Porath, 1973, p. 203). The economic climate subsequently improved and the unemployment rate fell to 9 per cent in 1968 and 5 per cent in 1969. The hardship associated with the recession is the most likely explanation for the fluctuations in the levels of Arab childbearing that occurred during the late 1960s. The evidence to support this assertion is the variations in the timing of the fertility fluctuations in different age groups. By 1966, families who were adversely affected by the employment situation were finding it difficult to raise the money to pay the dowries for their sons' brides. The marriage rate fell and the fertility of women under 25 reached a temporary low in 1968 (Table 2.3). Among older women, the fertility low point coincided with the 1967 peak in unemployment.

The substantial reductions in the levels of childbearing among women aged 25 plus between 1965 and 1967, and the subsequent partial recoveries, suggest that, in times

Table 2.10 Mean number of children ever-born per woman currently in her first marriage by marital duration and husband's occupation, Arabs in Israel, 1983

	Duration of marriage (years)						
Occupation	0- 4	5- 9	10-14	15-19	20-24	25-29	30-34
Professional	1.1	2.7	4.1	4.9	5.4	6.0	6.5

Managerial & clerical	1.2	2.7	4.1	4.8	5.6	5.8	
Sales	1.2	2.9	4.6	5.7	7.4	7.7	7.9
Skilled workers	1.0	3.0	4.9	6.2	7.0	7.5	8.0
Service workers	1.1	3.2	5.1	6.2	7.6	8.3	8.7
Unskilled workers	1.1	3.2	5.2	6.9	7.6	8.8	9.3
Agricultural workers	1.2	3.4	5.0	7.3	8.3	9.0	9.5

Source: Israel, CBS (1987a), pp. 274-275.

Table 2.11 Percentage illiterate by population group, age and sex, Palestine, 1931

Age	Muslims		Christians		Jews	
	Male	Female	Male	Female	Male	Female
7-13	69	93	34	43	11	15
14-20	71	94	19	41	4	12
21+	78	98	29	63	6	25
All 7+	75	97	29	56	7	21

Source: Bachi (1977), p. 46.

Table 2.12 Israeli Arab women married for 10-14 and 25-29 years in 1961, 1972 and 1983 by selected socio-economic characteristics and population group

	Women married 10-14 years			Women married 25-29 years		
Population group	1961	1972	1983	1961	1972	1983
Percentage of women with 5+ years schooling						
Muslims	4	25	62	2	9	18
Christians	61	75	92	36	54	71
Percentage of women with husbands with:						
A. 5+ years of schooling						
Muslims	32	59	81	12	30	52
Christians	76	84	95	48	60	83
B. 9+ years of schooling						
Muslims	3	10	26	3	7	11
Christians	26	27	50	10	25	36
C. Academic, other professional, managerial or clerical occupations						
Muslims	4	5	12	1	6	9
Christians	15	17	27	15	17	24

Source: Israel, CBS (1994a), pp. 134-135, 148-149, 240-241.

of severe economic hardship, many families regarded the costs of an additional child as burdensome. Moreover, the recession must have heightened parents' awareness of the vulnerability of workers in manual, often casual, jobs. It seems plausible that it was at this time that the idea that one or two sons with secure, salaried positions were a better investment than several sons with inferior employment prospects spread rapidly among the Palestinians in Israel. This idea was probably reinforced when, as a consequence of

both the economic boom which followed Israel's occupation of the West Bank and Gaza Strip and the employment of many workers from these territories in the lowest status jobs in Israel, improved employment opportunities opened up for Israeli Arabs.

The most detailed information available on socio-economic differentials in fertility in the Occupied Territories is for statistical areas in Arab Jerusalem in 1983. A summary of the fertility data and selected socio-economic characteristics of the areas is presented in Table 2.13 and the data are discussed in greater detail in Tamari and Scott (1991). Some 97 per cent of Jerusalem's Palestinians (and only 250 Jews) live in these 25 areas (estimated from JIIS, 1985). The measure of fertility is the mean number of births to ever-married women aged 30-39. This is one of the many demographic and socio-economic measures estimated by the Israeli Central Bureau of Statistics for each of the 1010 urban statistical areas in Israel and Arab Jerusalem. As an index of the level of childbearing it is not ideal but it does give a rough indication of the combined effect of delayed entry into marriage and family limitation. For presentation purposes, the data in Table 2.13 are arranged in descending order of family size. Very broadly, the low fertility areas correspond to the quarters of residence of the Palestinian upper and middle classes, the medium fertility areas are the working class quarters and the high fertility areas are the rural and semi-rural communities which were incorporated into the Jerusalem Municipality in 1967. Ordinary least squares regression was performed on the data for the 25 areas and the r-squared values are included in the table. Caution is required in interpreting the regression results because of the 'ecological fallacy'. However, although causal relationships cannot be inferred, the fact that all the socio-economic measures shown are associated with fertility is suggestive. In particular, it is clear that the association between fertility and employment in white collar occupations is closer than the association between the level of childbearing and education or women's employment.

As noted in Section 2.2.3, the total fertility rate for Muslims in Jerusalem fell from 7.5 in 1972 to 4.9 in 1983. In contrast, the total fertility rates in the rest of the West Bank and Gaza Strip remained at around 7 births per woman in the early 1980s. Jerusalem has a

Table 2.13 Mean number of births to ever-married women aged 30-39 and selected socio-economic characteristics, Palestinian quarters in Jerusalem, 1983

Quarter / sub-quarter	Mean births to women 30-39	Population 15+		% of women 15-60 employed	% of households with a vacuum cleaner	% Christian among the Arab population
		% in academic, managerial, technical or clerical occupations	Median years of schooling			

			Male	Female			
Low fertility							
Christian Quarter	3.3	45.3	11.1	8.5	19.1	5.4	81
Shu'afat West	3.6	50.5	10.6	9.5	23.5	18.7	10
Sheikh Jarrah	3.6	41.4	12.2	9.8	18.0	11.4	21
Nablus Road	4.1	39.5	10.7	9.6	18.7	12.8	35
American Col., Bab Zahireh	4.2	44.3	12.2	10.1	14.0	13.5	14
Bayt Hanina N, Nusseibeh	4.5	41.5	10.9	9.4	15.5	13.6	29
Weighted mean	4.0						
Intermediate fertility							
Wadi Hilweh	5.1	9.9	8.7	6.3	5.9	0.0	3
At-Tur N., 'Aqbat as-Sawana	5.1	25.9	9.6	8.8	11.8	9.5	8
Shu'afat East, Ras Hamis	5.2	27.2	10.4	8.6	9.0	7.7	9
Wadi Joz	5.5	32.7	10.6	8.9	24.8	6.3	7
Ras al-'Ammud	5.7	18.7	8.4	7.0	7.1	2.3	2
Muslim Quarter (A)	5.7	22.9	9.5	6.9	12.6	0.4	13
Mt. Olives, at-Tur South	5.7	15.8	8.7	7.1	6.0	3.7	12
Bayt Safafa South, Sharafat	5.8	27.1	10.1	8.9	13.3	4.3	6
Bayt Hanina South	5.9	25.5	10.5	8.8	8.2	9.4	16
Abu Tur E., Jebel Mukkaber	5.9	20.3	8.9	6.7	5.6	1.7	3
Weighted mean	5.6						
High fertility							
Muslim Quarter (B)	6.0	25.4	8.4	7.8	14.3	2.5	22
Silwan	6.4	13.7	8.9	6.3	4.2	0.0	3
Kafr 'Aqab, Atarot	6.4	24.2	10.7	7.4	6.4	1.1	4
Muslim Quarter (C)	6.6	13.8	8.5	6.7	6.3	0.0	3
Umm Leisun	7.0	12.9	7.5	5.5	1.0	0.0	0
'Issawiyyeh	7.1	8.5	8.6	6.2	6.2	0.0	0
'Arab as-Sawahra	7.2	11.0	8.1	0.9	2.4	1.0	0
Shu'afat camp	7.4	13.0	6.8	6.0	3.9	0.0	1
Sur Bahir, Umm Tuba	7.4	14.1	9.2	6.7	6.7	0.6	2
Weighted mean	6.8						
Weighted total	5.5						
R^2 - 25 quarters/sub-quarters		0.76	0.59	0.51	0.58	0.61	0.43
R^2 - excluding Wadi Hilweh		0.87	0.62	0.55	0.62	0.66	0.45

Source: JIIS (1985), (1986), (1988).

higher profile occupational structure than the other areas. For example, in 1983, 27 per cent of employed persons in Jerusalem were engaged in white collar jobs compared with only 12 per cent in the West Bank and 11 per cent in the Gaza Strip in 1987 (Israel, CBS, 1984, SAI, pp.764-5, and JIIS, 1988, pp.8-10). As Tamari and Scott (1991) observe, however, another very important difference is that, because Jerusalem was annexed by Israel, rather than 'administered', Jerusalem residents participate in the Israeli national insurance scheme. As a consequence, the Jerusalem population are entitled to child allowances and pensions and have access to health services which are superior to those provided for the residents of the West Bank and Gaza Strip. Child mortality in Jerusalem is lower than elsewhere in the Occupied Territories (see Chapter 3) and Jerusalem parents

are less dependent on their children for support in old age. Such factors may be critical for understanding the differences between fertility levels in Jerusalem and the other Occupied Territories.

Education and women's status

According to Graham-Brown, it was women in the upper strata of society who experienced the most dramatic changes during British rule.

> Until the early twentieth century they were on the whole strictly secluded, but from World War I onwards their fashions, social lives and personal freedoms probably changed more than those of any other class. (Graham-Brown, 1988, p.27.)

The process began when the Muslim and Christian elite allowed their daughters to attend school. By the end of British rule, some women from these groups were engaging in political activity, a few were employed as teachers or administrators and an even smaller number had embarked on training in law or medicine. But, as Graham-Brown (1988, p.29) stresses,

> The purity and probity of women were highly valued in all communities and classes.

and,

> ... the fact that women were permitted to work rarely had any radical effect on the roles which men expected them to play in the family. (Graham-Brown, 1988, p.169.)

Professional families are the first to recognise that education is an investment; it becomes a financial expense that reflects their aspirations for their children. The initial motivation for schooling daughters - that educated women would attract equally trained and professional/skilled husbands - proved correct (see Tamari and Scott, 1991).

Delayed entry into marriage is associated with increased female school attendance. But the direct effect on the level of childbearing of variation in this proximate determinant is small compared with educational differentials in marital fertility. The mean number of births per Israeli Muslim woman by duration of marriage and both education and labour force participation are shown in Table 2.14. There is a strong inverse relationship between the mean number of children ever-born and years of schooling at all

Table 2.14 Mean number of children ever-born per woman currently in her first marriage by marital duration, years of schooling and employment status, Muslims in Israel, 1983

Years of schooling		Duration of marriage (years)						
		0- 4	5- 9	10-14	15-19	20-24	25-29	30-34
0-4 years	Not employed	1.2	3.3	5.5	7.0	8.2	9.0	9.4
	Employed	1.3	3.8	5.0	6.5	8.7	9.2	9.8

5-8 years	Not employed	1.1	3.2	5.0	6.4	7.3	7.7	8.3
	Employed	1.0	3.0	4.5	5.8	6.2	7.3	9.1
9-12 years	Not employed	1.0	2.9	4.5	5.8	6.2	6.2	7.9
	Employed	1.1	2.7	4.1	4.5	3.2		
13+ years	Not employed	1.1	2.6	3.5	4.0	4.8		
	Employed	1.1	2.8	3.6	4.4			

Source: Israel, CBS (1987a), pp. 258-9.

marriage durations in excess of five years. Of equal, if not greater, significance are the employment status results. These reveal that in both the minimally educated and the college educated groups, participation in paid work has rather little effect on family size. In contrast, in the two intermediate educational strata there is a difference of one to two births between women who are and are not employed.

The politics of fertility

There is no 'official' pronatalist policy for the Palestinians (Tamari and Scott, 1991). But, the 1984 conference on *The Demographic Characteristics of the Palestinian People* recommended, *inter alia*, the creation of incentives for increasing the fertility of Palestinian women. The Palestinians were not the first to discover the fertility component of the 'demographic struggle'. Zionists have been obsessed with the difference in the levels of Arab and Jewish fertility since at least the 1930s. In 1940 Roberto Bachi wrote an article in *Ha'aretz* (a Hebrew newspaper) entitled, 'The Decline in Fertility: A National Danger' (Friedlander and Goldscheider, 1979, p.232, footnote no.2). Ben Gurion, the first Prime Minister of Israel, was also concerned. He established the 'Ben Gurion Prize' which paid 100 Israeli lira (about 300 US dollars at the exchange rate at the time) to every woman who gave birth to a tenth child. The first prize was awarded in 1949 but it was abolished ten years later when it became obvious that many of the prizewinners were Arab women. Friedlander and Goldscheider, the source of this information, note:

> It has never been argued openly that Arab women should not have received the prize on the grounds that a population with a birth rate of over 50 per 1,000 hardly needed pronatal incentives; yet this was indeed the case. This anomaly arose because the prize that was clearly instituted as a symbolic act to encourage Jewish families to have more children was so frequently granted to Arab women... Understandably, Ben-Gurion later suggested that any pronatal measures in Israel ought to be administered by the Jewish Agency (which is a Jewish, not a state, organization) and not the government. (Friedlander and Goldscheider, 1979, p.126.)

All the evidence examined indicates that the efforts of the Palestinians to raise the birth rate, like those made by the Israelis some years earlier, bore no fruit. The downward trend

in Palestinian fertility in Israel and East Jerusalem continued, indeed accelerated, during periods of heightened demographic nationalism.

2.4 Summary

To summarise, it is reasonable to assume that during the second quarter of the 20th century the Muslim total fertility fluctuated between six-and-a-half and eight births. The high level of childbearing was a direct consequence of early and universal marriage and the relatively high rate of widow remarriage. However, because of the long period of postpartum infecundability, inferred from the anthropological evidence on prevalence and duration of breast feeding, marital fertility did not approach its theoretical maximum. For the majority of the population, however, at least one of Coale's conditions for fertility transition was not met. This is that fertility control was not perceived to be economically or socially advantageous.

For Palestinian Christians in the 20th century, the pattern of delayed marriage and never marriage is the feature that distinguishes them from Palestinian Muslims and led to their total fertility rates of around four and a half births. The levels of around five seen among Christians in Israel is accounted for by the smaller proportions of single women and the inclusion of fewer Europeans in the data.

Gradually though, the fertility of all Palestinians in Israel and Jerusalem did come to decline from eight to around five. The main proximate determinants appear to be the increasing age at marriage, use of contraception within marriage, and, in Jerusalem, the decrease in the proportion married. The main underlying factors are impossible to quantify but appear to be structural changes including education, entitlement based on citizenship of Israel to some of the benefits of the Israeli welfare state, and a delayed effect of infant mortality decline. Patterns in Gaza are described in more detail in Chapters 6 and 7.

CHAPTER 3

PALESTINIAN CHILD MORTALITY

3.1 Introduction

As with Chapter 2, this chapter sets the context for the Gaza city communities by describing the published data on Palestinian infant and child mortality for the period up to 1985. The Mosley and Chen (1984) framework structure is used as a model. Again, as with Chapter 2, this chapter first discusses data for Palestine, then Israel and then finally, where available, the Occupied Territories.

3.2 Palestinian child mortality levels, trends and causes of death

3.2.1 Gaza Strip and West Bank

There are limited data on morbidity and mortality for the Palestinian populations living in the Occupied Territories for the period of interest. Estimates of levels of infant and child mortality in the West Bank have been computed from the information collected in the 1961 Jordanian census. According to these estimates the probability of dying during infancy ($_1q_0$) and before age five ($_5q_0$) fell from 200 and 300 per thousand in 1947 to 140 and 210 per thousand in 1955 (Hill, 1983, p.302). No comparable figures exist for the Gaza Strip during this period. Estimates of the level of infant and child mortality in the Occupied Territories for the years since 1960 stem from six sources:

- Israeli Central Bureau of Statistics (CBS) figures.

  Estimates for 1967 are derived from the answers to two questions asked of 20 per cent of ever-married women who were enumerated in the census of that year. These are, 'How many children has she born during the past five years who are still alive?', and, 'How many children has she born during the past five years who have since died?' (Israel, CBS, 1968a, p.xxxii).

  Estimates for subsequent periods take into consideration both the results of several surveys conducted by Israeli demographers in the Occupied Territories and, '... an

assessment of the level of economic and social development' (Israel, CBS, 1983, p.123).

- Reported infant mortality rates for Palestinians residing in the Jerusalem Municipality.
- Death registration data for the Gaza Strip and West Bank populations published in Israeli Ministry of Health reports.
- UNRWA clinic record data for the populations of a varying number of refugee camps in the Gaza Strip and the West Bank.
- Small-scale studies conducted by Palestinians.
- The 1995 Demographic Survey in the West Bank and Gaza Strip conducted by the Palestinian Central Bureau of Statistics (CBS). The mortality estimates derived from this survey are mentioned briefly in Chapter 8. However, since the detailed results have not yet been published, they cannot be considered in this thesis.

The Israeli CBS mortality rates for 1967 are considered reliable. The estimated ${}_1q_0$s and ${}_5q_0$s are: East Jerusalem 126 and 208, the remainder of the West Bank 152 and 255, and the Gaza Strip together with North Sinai 162 and 276 per thousand.[7] [8] According to Hill (1983), the limited improvement in child survival in the West Bank between 1947 and 1967 is partly explained by the changing composition of the population which was a consequence of well-educated Palestinians leaving the West Bank.

Since the 1970s there has been great interest in, but little agreement on, the levels of child mortality in the Occupied Territories. The situation prevailing in the early 1980s is described in the introduction to a report (Vermund *et al*., 1985, pp.6-7) which was published whilst the data collection for this study was in progress:

> For several years, a debate has remained unresolved regarding the IMR [infant mortality rate] and other vital statistics in the West Bank and the Gaza Strip. Whereas Israeli Ministry of Health officials believe that reported death rate[s] for infants and others give a fairly accurate picture (West Bank IMR = 28 deaths per 1000 live birth[s] and Gaza Strip IMR = 43 deaths

[7] The figures for the Gaza Strip and West Bank excluding Jerusalem are the 'adjusted' figures presented in Schmelz *et al*., 1977, p.76. The correction was made after it became apparent that the reference period for births was closer to six years rather than the stipulated five years. The original and adjusted figures differ by less than five per cent. The estimates for Jerusalem are calculated from data given in Schmelz, 1974.

[8] The CBS uses the rounded ${}_1q_0$ figure of 150 per thousand and corresponding ${}_5q_0$ figure to derive its population estimates for both the Gaza Strip and the West Bank in the late 1960s and early 1970s.

> per 1000 live births in 1982), the Israeli Central Bureau of Statistics (CBS) believes that there is considerable underreporting of infant deaths, with estimates of IMR closer to 70. Field surveys with UNRWA data and by Birzeit University researchers gave estimates even higher than CBS, presumably because of selection of especially needy study populations and/or their earlier date of IMR estimate[s]. (References omitted.)

Other information on deaths and morbidity which is usually helpful for assessing the reliability of mortality rates is both limited and affected by the same problems as the estimates of mortality levels. The two sources of cause of death and age at death statistics are UNRWA data for refugees and the Ministry of Health figures derived from reported child deaths. In general these show an ever declining proportion of deaths from notifiable diseases and a shift to younger ages and away from infectious causes. Details are presented in Chapter 8.

3.2.2 Palestine

Estimates of infant mortality and the probability of dying before age five for Muslims, Christians and Jews in Palestine are depicted in Figure 3.1 and Figure 3.2. According to official sources, the reporting of deaths at young ages was defective before the late 1920s and deaths were underreported after rationing was introduced in 1943 (Palestine Government, 1946, Vol. III and Palestine, DS, 1947). The mortality estimates would appear to substantiate these observations but the estimates for the other period when events registration was disrupted - 1936-38 - do not deviate substantially from the general downward trend.

The registration statistics indicate that during the second quarter of the 20th century each of the population groups experienced a substantial reduction in mortality at young ages. Between 1927-30 and 1940-42 the Muslim infant mortality rate fell by 24 per cent (from 184 to 140 infant deaths per thousand live births) and the estimated probability of dying by age 5 declined by 26 per cent (from 412 to 303 per thousand) (Palestine, DS, 1947). The decline in Christian child mortality was greater than among Muslims and the improvement in survival of Christian children was greater at ages 1-4 than in infancy. The reported Christian infant mortality rate fell by 38 per cent (from 163 to 101) and mortality

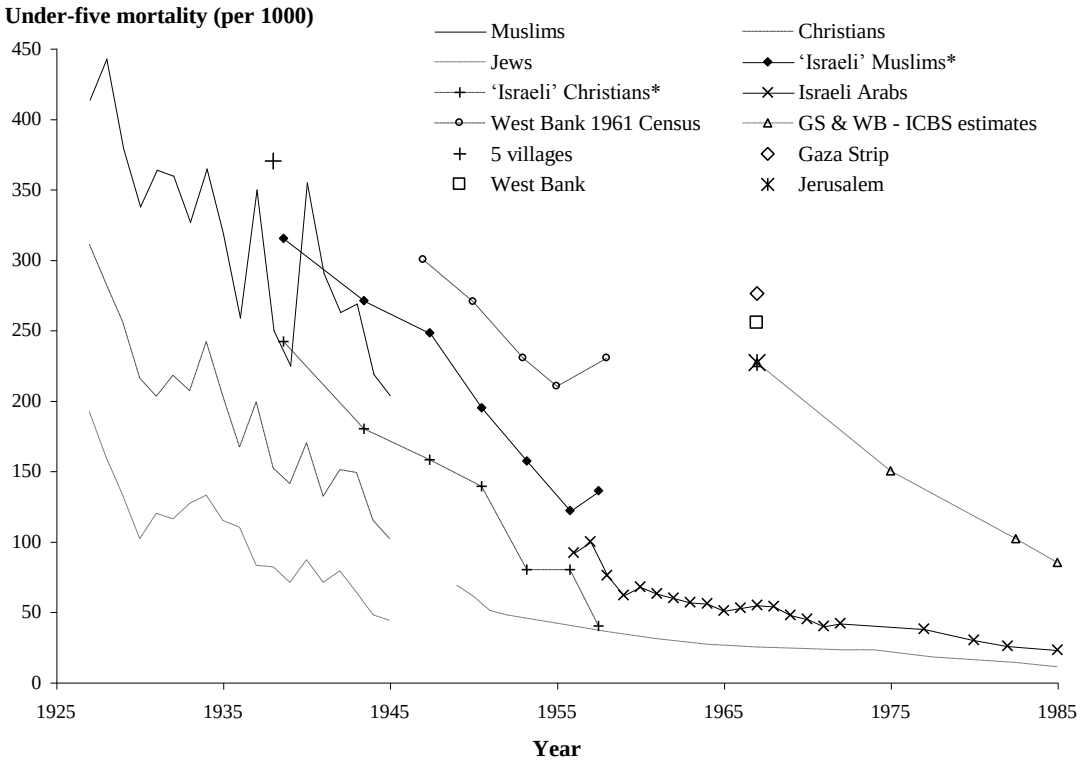

Figure 3.1 Probabilities of dying by age 5, Palestine, Israel and the Occupied Territories, 1927-85

* see text. Sources: Palestine, DS (1945), (1947); Jordan, DS (1964); Israel, CBS (various years) SAI, (1966), (1987b); Schmelz *et al.* (1977).

at all ages under 5 dropped by 47 per cent (from 283 to 151). The corresponding figures for Jews are a 41 per cent decline in infant mortality (from 100 to 59) and a 51 per cent reduction in the probability of dying before age 5. However, it is important to note that the variations in Jewish child mortality patterns over time are not directly comparable to the figures for Arabs. This is because with the immigration of large numbers of non-Palestinian (mainly European) Jews, the composition of the Jewish population changed substantially between the beginning and the end of the British Mandate. In contrast, the Arab population of Palestine was essentially a closed population.

In addition to the registration statistics, mortality estimates for the end of the Mandate period are available for the Arab population who remained in that part of Palestine which became Israel in 1948. These measures are derived from the reported number of children ever-born and children who died before age 5 which were collected from Arab women in the 1961 Israeli Census. The estimated 5q0s for Israeli Arabs for the period including the last 10 years of British rule are shown in Figure 3.1. The figures for both Muslims and Christians reveal a clear downward trend in child mortality after 1938. Moreover, the

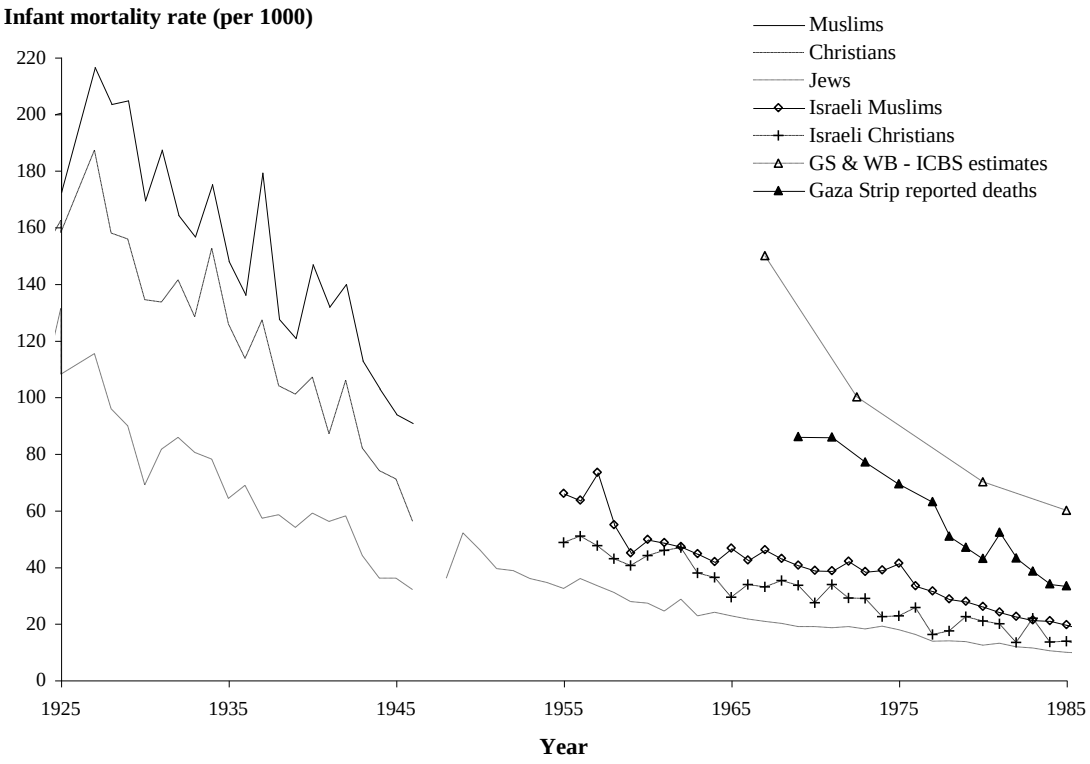

Figure 3.2 Infant mortality rates, Palestine, Israel and the Occupied Territories, 1925-85

Sources: Palestine, DS (1947); Jordan, DS (1964); Israel, CBS (various years) SAI, (1987b), (1994b); Israel, MH (1986).

estimates for 'Israeli' Muslims for the early 1940s are remarkably close to the registration-based statistics for all Muslims in Palestine at that time. Although the Israeli Muslims are not a representative sample of the Muslim population who were resident in Palestine before 1948, this result does suggest that the Mandate registration estimates of mortality levels and trends are plausible. In contrast to the findings for Muslims, the indirect estimates of mortality for 'Israeli' Christians are substantially higher than the reported levels of Christian child mortality in Palestine. No evidence has been found that indicates that the registration of vital events among the more urbanised Christian population was less complete than among the Muslim population. It therefore seems likely that the Palestinian Christians who came under Israeli rule were among the more disadvantaged sections of this community. This finding is consistent with Morris's (1987) assertion that the Palestinian upper and middle classes constituted a disproportionate number of the refugees who fled the territory which became Israel in 1948.

Infant mortality rates derived from death registration data by place of residence in Palestine for 1927 to 1944 are presented in Table 3.1. The other measures of mortality

Table 3.1 Reported infant mortality rates by population group and place of residence, Palestine, 1927-44

	Infant deaths per 1000 live births						% of urban births
Place of residence	1927-9	1930-2	1933-5	1936-8	1939-41	1942-4	1942-4
Muslims							
Total	184	162	159	148	134	117	
All villages	181	160	158	148	135	115	
All towns	193	166	164	148	131	122	100
Jerusalem, Jaffa, Haifa	190	162	179	145	127	120	38
Jerusalem	118	116	125	114	113	89	10
Jaffa	229	184	194	166	146	138	17
Haifa	188	167	202	137	106	121	11
Other towns	195	169	153	150	133	123	62
Acre	166	132	160	170	128	125	3
Ramleh	252	189	174	172	120	151	4
Nazareth	213	199	183	159	108	95	2
Gaza	176	169	142	161	162	144	12
Christians							
Total	163	134	135	115	98	87	
All villages	163	136	150	129	102	90	
All towns	163	133	129	110	97	86	100
Jerusalem, Jaffa, Haifa	124	108	103	92	87	78	62
Jerusalem	104	99	103	90	96	74	23
Jaffa	166	130	104	98	84	81	15
Haifa	114	103	101	90	79	81	24
Other towns	215	174	176	142	115	99	38
Acre	129	60	164	111	103	69	2
Ramleh	157	113	158	114	99	89	4
Nazareth	214	140	130	97	94	93	9
Jews							
Total	100	79	73	62	56	45	
All villages	59	57	59	44	43	36	
All towns	109	84	77	68	61	48	100
Jerusalem, Jaffa, Haifa	117	97	90	71	67	54	48
Jerusalem	115	104	90	85	70	53	26
Jaffa	238	159	167	106	89	75	6
Haifa	98	60	65	43	48	47	15
Other towns	98	65	60	65	55	43	52

Source: Palestine, DS (1947).

available for the end of this period are the retrospective data that were collected from Arab women in 1961. These reported proportions of children who died before age 5 born to currently married women in their first marriage are given in Table 3.2. Most of the offspring of women aged over 45 in 1961 were born in Palestine before 1948.

Jewish children living in the rural areas of Palestine were less likely to die than their counterparts in the towns (Table 3.1). This urban-rural differential is well established. It is attributed to the concentration of recent European Jewish immigrants in the rural

Table 3.2 Proportions of children born to currently married women in their first marriage who died before age 5 (per 1000 live births) by age of woman, population group and locality, Israel, 1961 Census

	Muslims					Christians			
	Total	Localities				Total[+]	Localities		
Age		Mixed towns[*]	Nazareth Shafa ‘Amr	Haifa villages	Northern villages		Mixed towns[*]	Nazareth Shafa ‘Amr	Northern villages
15-19	141			*x*	147	*X*		*x*	
20-24	111	49	89	141	112	32	*x*	26	51
25-29	110	40	58	135	109	72	*x*	48	124
30-34	146	76	108	184	131	74	28	77	101
35-39	186	50	159	222	171	133	83	86	176
40-44	241	207	264	224	226	151	121	159	156
45-49	269	76	270	271	278	178	127	149	223
50+	322	157	393	320	339	242	211	222	253

[*] Towns with large Jewish populations: Tel-Aviv-Jaffa, Haifa, Acre, Ramleh, Lydda, Jerusalem.

[+] Excluding European Christians, who constituted 19 per cent of currently married women. These women are included in the figures for the localities; most resided in the mixed towns.

x Small numbers.

Source: Israel, CBS (1966), p. 75.

settlements and the high proportion of the poorer classes, - indigenous Orthodox Ashkenazi and Oriental Jews - in the less salubrious urban localities (Bachi and Kallner, 1945, p.6).

According to the Mandate registration statistics, the impact of urban and rural residence differed between the Muslim and Christian populations and in neither case did the pattern mirror that of the Jewish population. Muslim infant mortality was broadly the same in most towns and rural areas (Table 3.1). Only in Jerusalem did Muslims have substantially lower mortality. In contrast, in the Christian population relatively low mortality was found not just in Jerusalem but also in Haifa, in Jaffa and Nazareth after 1929 and in Acre and Ramleh after 1935. In the other small towns Christian infant mortality was high. In fact it was even higher than in rural areas or than among Muslims in small towns up to the mid-1930s.

The 1961 Census child mortality proportions do not completely confirm this picture. In particular, the figures in Table 3.2 suggest that for Muslims, as for Christians, mortality was relatively low not just in Jerusalem but also in Acre, Haifa, Jaffa, Lydda and Ramleh.[9] This might be because these data refer only to that part of the population that

[9] In 1961, 59 per cent of the Arab population in these 6 towns lived in Haifa and Acre and only 11 per cent lived in Jerusalem (Israel, CBS, 1982, SAI, pp.50-51).

remained in Israel after 1948 or to the fact that a proportion of these children were born after the state of Israel was created. Nevertheless, despite these inconsistencies between data from the two sources, the differences in the patterns of residential differentials in mortality between the populations and the exceptionally high mortality of Christians in small towns suggest that, in addition to environmental and economic conditions, other factors may have influenced child survival during the Mandate. The various possible determinants of mortality levels and trends are considered further in later sections of this chapter.

The cause of death statistics for the Mandate period are less reliable than the child mortality data because few deaths in Palestine were medically certified. Moreover, as the Annual Reports of the Department of Health indicate, the reporting of diseases and causes of death gradually improved and this distorts the interpretation of changes in patterns over time. Nevertheless, a broad impression of the relative contributions of the different causes to overall child mortality can be gleaned from the available data.

Estimates of infectious disease morbidity and mortality for the total population are presented in Table 3.3 and causes of child deaths in urban areas are given in Table 3.4. Of the notifiable diseases, measles was the leading cause of death and the triennial peaks in Arab mortality (Figure 3.1 and Figure 3.2) are explained by measles epidemics (Palestine, DH, various years and Bachi and Kallner, 1945). Although there was a very serious measles epidemic in 1940, the figures in Table 3.3 suggest that there was a small decline in measles case fatality between 1923-25 and 1941-43. Other fatal notifiable diseases which declined in incidence and case fatality were whooping cough and erysipelas (similar to scarlet fever). Occasional outbreaks of smallpox occurred but in most years there were very few deaths. Typhoid was a more significant cause of mortality but relatively few deaths at young ages were attributed to this disease - an average of 10 per 100,000 Muslim children aged 0-4 between 1935 and 1945 compared with between 17 and 27 deaths per 100,000 population aged 5-9 and 25-29 (Kligler and Bachi, 1945, p.252). The incidence and deaths from diptheria, but not the case fatality, would appear to have increased over time and diptheria was a significant cause of child deaths in the towns (Table 3.4).

The notable exclusions from the early list of notifiable diseases are tuberculosis and infectious pneumonia, which became optional notifiable diseases in the 1930s, and malaria. According to the reported statistics, mortality from tuberculosis and infectious

Table 3.3 Reported cases, deaths and case-fatality from selected infectious diseases by population group, Palestine, 1923-43

	Cases per million population					Deaths per million population					Deaths per 100 cases				
	1923-5	1941-3				1923-5	1941-3				1923-5	1941-3			
	Total	Total	Muslims	Christians	Jews	Total	Total	Muslims	Christians	Jews	Total	Total	Muslims	Christians	Jews
Notifiable infectious diseases															
Measles	7949	2397	3575	925	361	1217	271	433	61	3	15	11	12	7	1
Typhoid fever	566	1893	1574	2452	2314	56	170	193	200	118	10	9	12	8	5
Whooping cough	964	398	552	301	125	53	6	10	3	0	6	2	2	1	0
Dysentery	919	263	58	256	658	40	10	9	13	10	4	4	16	5	2
Puerperal fever	31	16	26	5	1	16	7	11	0	0	52	41	43	0	0
Erysipelas	158	117	128	119	96	13	8	12	3	2	8	7	10	2	2
Diptheria	48	329	47	150	929	8	16	19	34	6	17	5	41	23	1
Paratyphoid fever	98	125	67	200	218	8	2	1	8	2	8	1	1	4	1
Cerebro-spinal meningitis	6	15	14	26	13	4	4	4	5	4	75	30	32	20	32
Smallpox	15	9	12	18	1	3	2	4	0	0	22	24	30	0	0
Plague	8	8	5	5	13	2	3	1	0	6	29	34	23	0	44
Typhus	57	210	105	87	446	1	9	11	3	5	2	4	11	3	1
Chicken pox	300	145	90	235	228	0	0	0	0	0	0	0	0	0	0
Scarlet fever	36	138	1	24	393	0	0	0	0	0	1	0	0	0	0
Mumps	223	193	182	630	97	0	0	0	0	1	0	0	0	0	1
Relapsing fever	19	18	21	26	8	0	0	0	0	0	0	0	0	0	0
German measles	5	2	0	3	6	0	0	0	0	0	0	0	0	0	0
Other infectious diseases															
	1931-2					1931-2					1931-2				
Pneumonia	738	184	245	87	92	437	100	121	63	52	59	54	49	72	57
Tuberculosis	606	381	343	359	460	229	161	183	121	127	38	42	53	34	28
Malaria	795	1119	1048	651	1379	3	3	4	0	1	0	0	0	0	0

Sources: Palestine, DH (various years); Palestine, DS (various years), Statistical Abstract of Palestine.

Table 3.4 Estimated deaths at ages 0-4 by cause, Palestinian towns, 1930-2 and 1944

	Deaths per 100,000 population aged 0-4				
	1930-2	1944			
	Total	Total	Muslims	Christians	Jews
Airborne diseases					
Pneumonia, bronchitis and influenza	2314	1015	1411	858	554
Measles	138	48	84	36	7
Diptheria	25	32	46	28	15
Whooping cough	12	3	2	7	2
Tuberculosis of respiratory system	7	4	3	5	5
Scarlet fever	2	0	0	0	0
Smallpox	1	14	18	15	9
Other respiratory diseases	45	48	23	36	85
Food and water-borne diseases					
Diarrhoea and enteritis	2747	1134	1977	713	177
Typhoid and paratyphoid	13	6	6	6	6
Non-respiratory tuberculosis	27	9	10	15	7
Other infectious and parasitic diseases	64	34	31	28	39
Vector-borne diseases					
Malaria	6	3	2	6	2
Congenital debility and malformations, prematurity & other diseases of early infancy	1022	616	652	635	563

Sources: Palestine, OS (1937), p. 23, Palestine, DS (1946), pp. 45-46 and Palestine, DH (1947), p.31.

pneumonia declined after 1930 and the figures in Table 3.4 indicate that relatively few children in the towns died from tuberculosis. Malaria was endemic in Palestine and is discussed in greater detail in Section 3.3.2. As early as 1922, over 20,000 patients at government dispensaries were treated for this disease (Palestine Government, 1946, Vol. II, p.700) but the health authorities made no attempt to collect statistics systematically on deaths caused by malaria.

The clearest picture of the main causes of child mortality during British rule is provided by the statistics in Table 3.4. Despite the fact that 2 per cent of child deaths in 1930-32 and 8 per cent of deaths in 1944 were not assigned to a particular cause and that some deaths were undoubtedly misclassified, these data indicate that the overwhelming majority of child deaths from infectious diseases were the consequences of the airborne infections pneumonia and bronchitis and the food- and water-borne diseases in the diarrhoea and enteritis group. Large numbers of deaths were also attributed to congenital anomalies, prematurity and other diseases of early infancy.

Consideration of the figures in Table 3.4 in conjunction with the quarterly infant mortality rates in Table 3.5 provides further insights into mortality differentials and

Table 3.5 Quarterly infant mortality rates by population group, 1933-5 to 1939-41

	Infant deaths per 1000 live births			
Date	Jan-Feb-Mar	Apr-May-Jun	Jul-Aug-Sep	Oct-Nov-Dec
Muslims				
1933, 1935	118	176	189	141
1936, 1938	115	144	175	109
1939, 1941	93	143	177	113
Christians				
1933, 1935	92	158	156	112
1936, 1938	87	120	166	74
1939, 1941	63	111	134	83
Jews				
1933, 1935	54	84	78	67
1936, 1938	52	65	83	58
1939, 1941	50	76	53	44
% decline 1933-5 to 1939-41				
Muslims	22	19	6	20
Christians	31	30	15	25
Jews	5	10	32	34

Source: Palestine, DS (1947).

changes in mortality levels from these two sets of causes over time. Muslim children experienced the highest risks and Jewish children experienced the lowest risks of dying from both respiratory and diarrhoeal infections and the risks for Christian children were intermediate between those for the other two groups. Moreover, the differences in deaths from these causes, together with measles, probably account for most of the differences in the overall levels of child mortality between the three population groups especially towards the end of British rule.

The quarterly infant mortality rates in Table 3.5 suggest that the principal causes of the Arab and Jewish child mortality declines, at least after 1930, may have differed. In the winter months of January to March when respiratory diseases predominate, Jewish infant mortality was already relatively low in 1933 and it fell very little over the next 8 years. But the Jewish infant mortality rate in the peak of summer, July to September, fell by over 30 per cent in the same short period. In contrast, Among both Muslims and Christians the largest improvement in infant survival occurred during the winter and the smallest improvement was in the summer when diarrhoeal infections were common. Thus by the 1940s, the differentials between the populations in deaths due to diarrhoeal and related causes were significantly greater than the differences in mortality from respiratory diseases.

3.2.3 Israel

Figure 3.1 and Figure 3.2 also show the decline in mortality among both Arab and Jewish children in the areas occupied by Israel in 1948. The earliest mortality statistics derived from Israeli registration data indicate that among Arabs in Israel the probability of dying by age 5 dropped from about 100 deaths per thousand in 1956-57 to around 65 in 1960, the reported Muslim infant mortality rate fell from 65 in 1955 to 50 in 1960 and the Christian infant mortality rate declined from 50 to 44 over the same 5-year period. These figures are known to be underestimates of the true level of mortality. According to Schmelz (1974, p.64), for example, over 10 per cent of Arab infant deaths in 1962-63 were not registered. The recorded drop in mortality under age 5 is, however, consistent with the 1961 indirect estimates of ${}_5q_0$s for Muslims who constituted the majority of the Arab population (Figure 3.1). Thus, whatever the precise figures for the mortality rates, there can be no doubt that there was a very substantial reduction in Arab child mortality during the 1950s. After 1960, Arab mortality declined gradually but steadily and by 1985 the probability of dying by age 5 had fallen to about 23 deaths per thousand.

Despite the improvements in Arab child survival in Israel the gap between Arabs and Jews which existed during the Mandate period has persisted. Even in 1985, Arab children were about twice as likely as Jewish children to die before age 5 (Figure 3.1). The Christian population in Israel is relatively small and mortality rates for children under 5 are only published for all Arabs combined. But, again, as the infant mortality rates in Figure 3.2 reveal, throughout the period from 1960 to 1985, Christian infants experienced lower risks of dying than Muslim infants but were more likely to die than Jewish infants.

The available evidence indicates that Arab child mortality differentials by place of residence have changed since 1948. The 1961 Census reported proportions of children born to women under 40 who died before age 5 indicate that in the 1950s children living in villages were at least 50 per cent more likely to die than children who resided in the six Arab/Jewish mixed towns (Table 3.2). Children born in the Arab towns of Nazareth and Shafa ‘Amr fared better than those living in villages but were less likely to survive that their counterparts in the mixed towns. Moreover, the level of child mortality among rural Christians was not markedly different from that of rural Muslims but large differentials in the survival of urban Christian and urban Muslim children existed.

The only measures of mortality by place of residence published since 1960 are infant mortality rates. However, it is difficult to monitor trends in urban and rural infant

mortality because of modifications to the classification of localities and the because of the inclusion of births and deaths in Arab (East) Jerusalem in the statistics for 1970 and later years. But it is clear from the published data that, by the 1980s, Arab infant mortality differentials by place of residence had narrowed considerably. In 1983-84, for example, the Arab infant mortality rates in localities with 20,000-199,999, 10,000-19,999 and 2,000-9,999 inhabitants were 19, 20 and 22 deaths per thousand live births respectively. (calculated from Israel, CBS, 1985, SAI , p.116 and 1986, p.109). The corresponding rate for the 'rural' population - residents in localities with less than 2,000 people and the population living outside localities, presumably largely bedouin - was 23. In the conurbations with more than 200,000 residents, infant mortality was low in Haifa and Tel-Aviv-Jaffa - 19 for the two conurbations combined but relatively high in Jerusalem at 22 deaths per thousand live births. Although no data exist on mortality differentials within Jerusalem, it seems likely that the higher infant mortality in this city could be at least partly attributable to the inclusion of several rural and semi-rural Palestinian communities within the Municipality (see Section 2.3.2).

Cause-specific infant mortality rates in Israel in selected years are presented in Table 3.6. Since the proportion of medically-certified deaths among Arabs of all ages increased from 84 per cent in 1963-65 to 96 per cent in 1973-75 (Abramson and Gofin, 1979, p.965) and 98 per cent in 1985 (Israel, CBS, 1987, SAI, p.134), the relative contributions of the different causes of deaths can be accepted as broadly accurate. The most significant change in Arab infant mortality between the early 1960s and 1985 was the substantial reduction in deaths from infectious diseases. Assuming that half of the deaths from unspecified causes in 1963-65 and all of the deaths from unspecified causes in 1985 were related to infectious diseases or nutritional disorders, the total mortality from such exogenous causes fell from 28 to 9 deaths per thousand live births and the relative contribution dropped from 63 per cent of infant deaths in 1963-65 to 38 per cent of deaths in 1985. Deaths from birth trauma and other causes of perinatal mortality also declined by over 50 per cent between 1975 and 1985. In contrast, there was only a small reduction in deaths attributable to congenital anomalies.

Table 3.6 also shows Jewish infant mortality rates by cause of death. The changes in the cause-specific mortality differentials between the two populations over time reflect the low level of infectious disease mortality among Jewish infants in the 1960s and the large reduction in deaths from exogenous causes among Arabs in the years up to 1985. Even in 1985, however, Arab infants were at least 3 times more likely to die than Jewish

Table 3.6 Cause-specific infant mortality rates (per 1000 live births) by population group, Israel, selected years

Cause of death	1963-5		1975		1985	
	Arabs	Jews	Arabs	Jews	Arabs	Jews
Pneumonia and bronchitis	6.9	1.9	6.1	0.8	0.7	0.2
Intestinal infectious diseases	9.2	1.2	6.5	0.8	0.4	0.0
All other infectious and parasitic	6.3	2.2	1.5	0.4	0.8	0.3
Sub-total	22.4	5.3	14.1	2.0	1.9	0.5
Congenital anomalies	6.3	4.6	6.7	4.3	5.4	2.4
Birth trauma and other perinatal	4.7	5.4	11.6	9.0	5.4	4.5
External causes }	12.0	7.8	1.0 {	0.3	0.8	0.3
All other and unspecified }			6.0 {	2.1	5.0	2.0
Infant mortality rate	45.4	23.1	39.5	17.9	18.3	9.8

Sources: Schmelz (1974), p. 67 and Israel, CBS (1987) SAI, pp. 138-139.

infants from both respiratory infections and intestinal and other infectious and parasitic diseases. The other significant gap in mortality rates between the two populations is in deaths attributed to congenital anomalies. By 1985, the difference in deaths from this group of causes accounted for one third of the total difference between the Arab and Jewish infant mortality rates.

3.3 Mortality framework

A sustained decline in mortality is one of the two components of the demographic transition. Since Notestein (1945) put forward his transition model in 1945, mortality theorists have sought to account for the established secular declines in mortality. In the early attempts to explain European mortality transitions, attention focused on the importance of two factors: improvements in the standard of living, particularly levels of nutrition, and the role of medical technologies. Subsequent, more careful analyses, including those that have tried to identify the causes of mortality reductions in developing rather than developed countries, have emphasised the contributions of government sanitation and public health programmes and changes in individual health behaviour such as personal hygiene. In turn, the investigation of the role of the individual has led to the examination of underlying social conditions and changes that precede, or coincide with, the widespread adoption of survival-enhancing practices.

By the 1980s, the search for a single set of dominant factors or a simple, all-encompassing, explanation for sustained mortality reductions had given way to the recognition that only a complex of different causal variables, specific to different environments, could possibly account for the varying speeds and different start and end

points of the array of mortality declines that have occurred at different times. Researchers turned their attention to the task of isolating the key stages and processes on the pathways from good health to death.

A conceptual framework that synthesised these efforts to look at processes and pathways for examining the determinants of childhood mortality was proposed by Mosley and Chen (1984). This model, with modifications suggested by van Norren and van Vianen (1986), is the basis for the analysis of the Gaza data. Although morbidity is associated with biological risk factors and the ultimate cause of any fatality is biological, the death of a child is the final outcome of a complex process. The chain of contributing determinants may include social, economic, environmental and behavioural factors each of which must operate via one or more biological mechanism to affect mortality. Thus the mortality model encompasses three broad levels of mortality determinants. The biological risk factors or direct determinants are the child's physical constitution at birth, nutritional status, and exposure and susceptibility to infections. Most remote from the final demographic outcome are the socio-economic determinants that include parental, household and community level variables. Intermediate between these two levels are the proximate determinants of mortality through which the effects of the socio-economic determinants are mediated. The proximate determinants comprise both the demographic variables of mother's age, parity and preceding birth interval and several behavioural variables ranging from infant feeding practices to preventive and curative health care.

3.3.1 Proximate determinants of mortality

Sex, birthweight and prematurity

Male sex, low and very high birthweight, and prematurity are perhaps the three biological variables most strongly associated with mortality. There is an extensive literature associated with each of these areas. In virtually all populations, males are more likely to die, especially in utero, and in the first month of life (see Waldron, 1998 and references therein). The pattern of excess male mortality often persists to older ages but, in settings with strong male preference and discrimination in the feeding and care of girls, the pattern is often reversed by the second year of life (see, for example, Dyson and Moore, 1983, Das Gupta, 1987 and Hill and Upchurch, 1995).

Low birthweight and prematurity are correlated and pre-term births are often small and under weight. For births at term, low birthweight is also a determinant of survival (Kramer, 1987).

Most of the data on Palestinian neonatal mortality show that boys were more likely than girls to die during the first month of life. At later ages, however, the patterns are often reversed. The graphs in Figure 3.3 summarise the information on sex differentials in child mortality that are available for the Mandate period and for Israeli Arabs up to 1971. In the graphs, the levels of mortality and the ratios of male to female mortality rates are indicated on the horizontal and vertical axes respectively. The graphs show that Jewish male infants were more likely to die than Jewish female infants and, apart from in 1942-44, there was an excess of male deaths at ages 1-4. Among Jews, the ratios did not change systematically as mortality fell. The data for Arabs reveal different patterns. In infancy, Muslim male children were disadvantaged but among Christians it was young girls who experienced higher levels of mortality. However, as the infant mortality rates fell, the relative position of Muslim girls worsened and Christian female infants also became progressively disadvantaged up to 1938. Among both Muslims and Christians, female mortality exceed male mortality in the 1-4 age group and this pattern persisted throughout the period from the late 1920s to the early 1940s.

The data for Israeli Arabs in Figure 3.3 show that, up to 1968, males experienced lower infant mortality but by 1971 the pattern had shifted in favour of females. Also, according to Schmelz (1974, p.69), excess Arab female mortality existed at ages 1-4 until 1967. The female disadvantage in this age group had, however, disappeared by the late 1970s (Israel, CBS, SAI, various years). By the 1980s, excess female mortality was confined to the post-neonatal period. For example, in 1985-86, excluding deaths from congenital anomalies and other causes of perinatal mortality, the female infant mortality rate was 14 per cent higher than that prevailing among males (Israel, CBS, 1987, SAI, p.140 and 1988, SAI, p.142) and in the years 1982-86 the Arab female post-neonatal mortality rate was between 12 and 27 per cent higher than the rate for males (Israel, CBS, various years, SAI).

Investigation of the causes underlying the sex differentials in Palestinian child mortality is hampered by the limited data available. It is possible that, as Langford and Storey (1993, p.276) have noted for Sri Lanka, there may have been a higher incidence of hookworm or other diseases among young girls in Palestine. However, given the higher value placed on males in Palestinian society (discussed in Chapter 2), excess female child mortality is probably largely a consequence of the poorer care that girls received in comparison with boys. Some evidence for this is provided by data from a survey of hospitals in 1943. Among Christian children under one year of age, the number of males

who were hospitalised was 2.1 times higher than the number of females. The corresponding figure for Muslim infants was 3.4 whereas for Jews it was 1.0 (Palestine, DS, 1944, p.365). Additionally, a possible explanation for the differences between

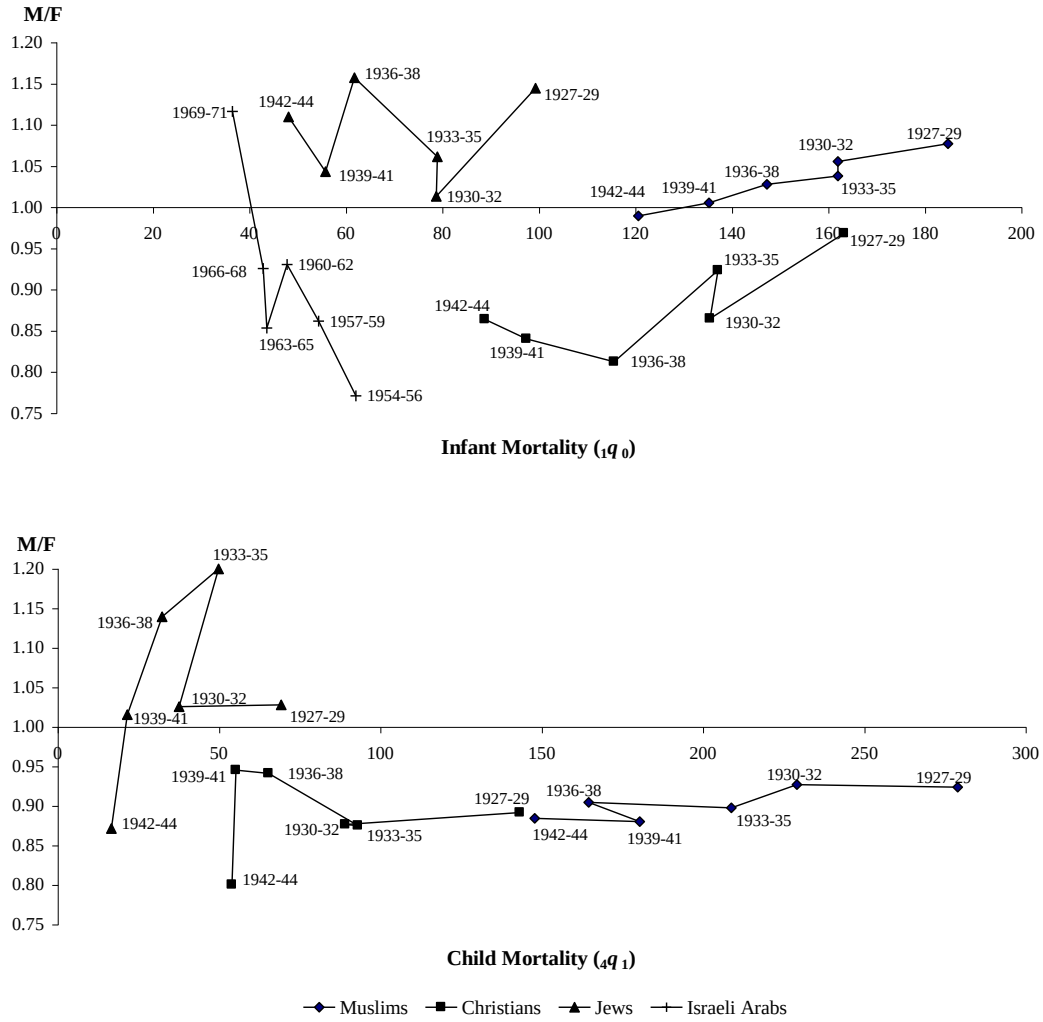

Figure 3.3 Ratio of male to female (M/F) mortality by the probabilities of dying in infancy and early childhood (per 1000), Muslims, Christians and Jews in Palestine, 1927-44, and Israeli Arabs, 1954-71

Sources: Palestine, DS (1947) and Schmelz (1974).

Muslims and Christians in the ratios of male to female infant deaths could be that the weaning period was particularly critical and that Christian infants were given food or milk other than breast milk at a younger age than Muslim infants. If this were the case, the decline in the sex ratios in infant mortality among both Muslims and Christians could be associated with a gradual shift to earlier supplementary feeding in both populations. It is, of course, always possible that the patterns observed stem from problems with the reporting of births and/or deaths. In this case the sex ratios at birth look plausible and it is

difficult to come up with explanations for why deaths of girls would be over-reported or deaths of boys would be under-reported.

Mother's age

Most studies reveal U- or J-shaped relationships between mothers' ages and their children's chances of dying. In both developed and developing countries, children born to young and older women are more likely to die than the offspring of women in their twenties and early thirties and the risks increase towards the extremes of the fertile ages (Population Reports, 1984). The excess mortality risks are particularly high for children of mothers aged under 18. For example, the results from 18 World Fertility Surveys (WFS) indicate that the average risk of dying before age 5 for children in this group was 41 per cent higher than for children of mothers aged 20-34. The comparable figure for 18 Demographic and Health Surveys (DHS) is 51 per cent (Hobcraft, 1992, p.8). Careful research has sought to disentangle interactions with, and the confounding effects of, other socio-demographic factors such as parity and spacing between births and to identify the biological mechanisms that could account for the observed variations in mortality risks.

The mother's physical immaturity may be the most important biological reason for elevated perinatal death rates among the infants of *very young* women (Population Reports, 1984). Other biological mechanisms that are more strongly associated with primiparity than with young maternal age are identified in the next section. But it is now generally accepted that the reason why many children of teenage mothers experience relatively high risks of dying is that teenage mothers are a select group who tend to be socially and economically disadvantaged and have poorer access to health care. This has been demonstrated for children born in developed and developing countries. For example, in a study of a small Brazilian city population that found higher perinatal and neonatal mortality rates among children of mothers under age 20 than among those born to women aged 20-29, the excess mortality risk disappeared when the family income and whether the mother received antenatal care were controlled (Barros *et al*., 1987).

The mechanism for which the evidence is strongest is the effect of older maternal age on congenital malformations associated with chromosomal abnormalities (Nortman, 1974). For example, in one study of Down's syndrome, a condition that is caused by a defective chromosome but is not generally associated with elevated mortality in childhood, the risk of Down's syndrome among births to women aged 35-39 was over twice the average rate among births to women aged 20-39, and the relative risk increased

to 8 among the children born to women aged 40 and above (Stark and Mantel, 1966, p.692 cited in Nortman, 1974). Other risk factors for the children of older mothers that are probably less important than conditions associated with chromosomal abnormalities are

Table 3.7 Infant deaths per 1000 live births by age at death, population group and mother's age at birth and birth order, Israel, 1981-4

		Deaths per 1000 live births			Percentage of births
		Infancy	Neonatal	Post-neonatal	
Mother's age at birth					
Muslims	<20	24.1	13.1	11.1	7.6
	20-24	24.4	12.9	11.5	32.7
	25-29	19.3	9.7	9.6	28.2
	30-34	18.6	9.5	9.1	17.4
	35+	26.2	14.0	12.1	13.5
	Unknown	-	-	-	0.7
	Total	22.1	11.5	10.5	100.0
Christians	<20	27.6	23.6	3.9	3.4
	20-24	12.8	6.9	5.8	34.1
	25-29	20.8	11.3	9.5	34.9
	30-34	11.6	6.5	5.1	18.2
	35+	10.3	5.8	4.4	9.0
	Unknown	-	-	-	0.4
	Total	15.7	9.0	6.7	100.0
Jews	<20	15.6	9.7	5.9	2.7
	20-24	12.4	8.6	3.9	25.4
	25-29	10.7	7.6	3.1	34.8
	30-34	10.2	7.3	2.8	25.4
	35+	12.5	8.7	3.7	11.5
	Unknown	-	-	-	0.2
	Total	11.4	8.0	3.4	100.0
Birth order of child					
Muslims	1	22.5	13.7	8.8	20.6
	2-3	23.3	12.3	11.0	32.0
	4-5	19.6	9.7	9.9	20.5
	6+	22.3	10.5	11.8	26.9
	Total	22.1	11.5	10.5	100.0
Christians	1	14.7	10.9	3.7	28.9
	2-3	15.9	8.5	7.4	46.4
	4-5	19.2	8.3	11.0	19.3
	6+	7.3	4.9	2.4	5.4
	Total	15.7	9.0	6.7	100.0
Jews	1	12.3	9.4	2.8	29.6
	2-3	10.7	7.3	3.4	52.3
	4-5	11.7	7.9	3.9	13.4
	6+	11.5	6.5	5.1	4.8
	Total	11.4	8.0	3.4	100.0

Source: Israel, CBS (1992), pp. 27-28, 30.

complications of delivery and pregnancy-induced hypertension. In the latter case the risks rise less severely for multigravidae than for prmigravidae (Haaga, 1989).

Within the Jewish and Muslim populations in Israel infant mortality differentials by age of mother resemble the patterns observed elsewhere (Table 3.7). In both populations, infants born to women aged 30-34 are less likely to die in the first month of life and at ages 1-11 months than infants born to older and younger mothers. In the Muslim population, the patterns are J-shaped with the highest mortality experienced by the children of mothers aged 35 and above. In contrast, in the Jewish population the Js are inverted suggesting that it is the children of Jewish teenagers who are the most disadvantaged group in this community. However, it is important to note that, in 1981-84, mortality among almost all of the highest risks groups of Jewish infants was lower than the mortality in the lowest risk groups of Muslim infants (Table 3.7). And, again, although the mortality rates by mother's age for Christians are erratic, the risk for the infants in this population are generally lower than those for Muslims and higher than those for Jews. In Section 3.3.2, it is suggested that some of the excess Arab infant mortality, particularly in the neonatal period, is probably associated with the higher prevalence of consanguineous marriages in this population. On the other hand, it is clear that the difference in the ages at which Arab and Jewish women bear their children is only part of the explanation for the significantly different Arab and Jewish infant mortality rates since even the infants of Muslim mothers aged 30-34 are three times more likely to die at ages 1-11 months than the infants of Jewish mothers of the same age.

Parity

Many investigations into the relationship between parity and infant mortality have revealed U-shaped patterns of risks in early and late infancy. Thus, the first and fourth and higher order births are at greater risk of dying than second-born and third-born children. In some countries this pattern persists at ages 1-4 but in others first births are at lowest risk and the level of mortality increases progressively with birth order (Bicego and Ahmad, 1996).

Haaga (1989) has examined the evidence for biological mechanisms and demographic factors that could account for variations in mortality by birth order. In the neonatal period, in particular, three biological mechanisms may be important. The three mechanisms are: pregnancy-induced hypertension, which is associated with premature delivery and placental abruption and these in turn are associated with low birthweight, intra-uterine growth retardation, and, where relevant, placental malaria (Haaga, 1989). In Haaga's opinion, all three mechanisms are more strongly associated with primiparity than with

young maternal age. In contrast, high parity births, especially in poor countries, may be at risk because of iron-deficiency anaemia and its link to prematurity.

Where higher parity births experience lower survival chances, competition with other siblings for both the mother's attention and the limited food resources available to the family may partly explain the association between birth order and mortality (Wray and Aguirre, 1969; Ebrahim, 1982). Also, Aaby *et al*. (1984) have demonstrated that for at least one infectious disease - measles - an increase in the severity of the disease and the case fatality rate is associated with an increase in the number of young children in the household. In an urban area of Guinea-Bissau, the ethnic group with the lowest measles case fatality rate has smaller families and longer birth intervals than other ethnic groups (Aaby *et al*., 1983). The researchers suggest that the association with crowding could be due to increased rates of intercurrent infection and/or a greater load of the virus.

Table 3.7 shows infant mortality patterns by birth order for the three population groups in Israel. The most consistent finding is that, in each population, first-born infants are more likely to die than higher order births during the neonatal period. Also, there is no evidence that neonatal mortality is especially high among fourth and higher order births. In contrast, among both Muslims and Jews, first-born infants are less likely to die at ages 1-11 months than all other infants and the highest risks in the post-neonatal period are experienced by sixth and higher order births. The level of post-neonatal mortality among first-born Christians is also very low but so is that for very high order births. However, the number of births in the latter group is very small.

Birth interval and survival of previous birth

A universal finding of demographic studies in developing countries is that a short preceding birth interval is associated with an increased probability of dying for the index child (see, for example, Rutstein, 1983, Hobcraft *et al*., 1985 and Hobcraft, 1992). Short and long intervals are defined in various ways but the inverse relationship persists. The relative risks of dying for children born shortly after the previous birth are highest in the neonatal period but excess mortality extends through infancy into the second year and frequently up to the fifth year of life (Bicego and Ahmad, 1996).

Since the association between birth spacing and child survival was first identified progress has been made in specifying some of the factors which contribute to the observed patterns. Included in the shortest interval are a disproportionate share of premature births and this partially accounts for the increased mortality risks, particularly

in the neonatal period (Wolfers and Scrimshaw, 1975). However, even after controlling for the confounding effects of prematurity, compared with other children, those who are born after a short preceding interval may experience significantly higher risks of dying at ages under two years (Miller *et al*., 1992). Early studies attributed the increased mortality to 'maternal depletion syndrome'- the failure of the mother to recuperate from the physically and nutritionally depleting effects of both pregnancy and breast feeding (Jelliffe, 1966). Hobcraft *et al*. (1985) found that the evidence from their analysis of WFS data supported the maternal depletion hypothesis. The same conclusion was drawn by Boerma and Bicego (1992) and Hobcraft (1992) from their examinations of DHS data. Boerma and Bicego suggest that maternal nutrition/depletion in the ante-natal period is a key factor in the relationship between short birth intervals and high early childhood mortality. It is also possible that if the reproductive structures such as the cervix have not recovered sufficiently from the first parturition, this may *lead* to premature delivery (Haaga 1989). But, in Haaga's (1989) opinion, the evidence supporting a significant relationship between a mother's nutritional status and her child's survival chances is weak. Rather, he suggests that the research findings point towards some mechanism interfering with the development in *early* pregnancy of the uteroplacental circulatory system and that this is associated with foetal growth retardation. And, as Haaga notes, the imperfectly developed respiratory and immune systems of small babies (low birthweight-for-gestational-age), as well as premature births, probably contribute to their susceptibility to infections throughout infancy and in early childhood. Whatever the precise mechanism, there seems to be general agreement that there is a high risk that an infant born after a short interval will have a weak constitution at birth.

In addition to "causing" a child death, either through maternal factors or competition for care, a short birth interval may be the consequence of an earlier child death (Omran, 1976). Thus children who follow a sibling who dies may face poorer survival chances for one or two reasons. There are risks associated with both short birth intervals and with the fact that women who have had one poor pregnancy outcome are more likely to experience another. Only by examining the impact of both the survivorship of the previous sibling and the length of the birth interval together can the more important determinant of mortality be identified. This is done in Chapter 9. Breast feeding also plays a key role: it is often a determinant of survival but also interacts with birth interval because of its effect on fertility.

Nutrition

A subsequent section in 3.3.2 on socio-economic status documents the increased prosperity experienced by most of the population towards the end of British rule in Palestine. These changes are likely to have led to improvements in nutrition and probably affected susceptibility to disease and case fatality once ill (see, for example, Table 3.3 for the reduction in measles case fatality). However, the one government study of nutrition which was conducted in 1942-43 revealed marked differentials in the nutritional status of children between and within the population groups. Jewish children were better nourished than Arab children and in both groups malnutrition was more common in the large towns than in rural areas (Palestine, DH, 1944). In 1942, for example, the proportions of children with poor height-for-weight ratios were rural Jews 7 per cent, urban European Jews 10 per cent, urban oriental Jews 15 per cent, rural Arabs 17 per cent, Arabs resident in small towns 17 per cent and Arabs resident in Jerusalem, Haifa and Jaffa 23 per cent (Palestine, DH, 1944). The corresponding figures for anaemia were 3, 8, 13, 26, 40 and 36 per cent respectively.

3.3.2 Distal determinants of mortality

Access to, and use of, health services

When the British seized control of Palestine from the Ottomans in 1917-18 they inherited a rudimentary health infrastructure. The only organised government medical services which existed were two municipal hospitals and municipal medical officers in some large towns. The British also took over responsibility for the health supervision of pilgrim traffic to and from Mecca and port quarantine facilities (Palestine Government, 1946, Vol. II, p.609). By contrast, a remarkable number of missionary and religious institutions existed: 23 general hospitals, 5 specialist hospitals, and 31 dispensaries, although the services that these provided had been disrupted during the war (Palestine, DH, 1922, p.70).

Early British health initiatives were organised under the Occupied Enemy Territory Administration and this became the Government Department of Health in 1920. The high priority given to health at the start of British rule is indicated by the figures on expenditure: between the years 1920-21 and 1924-25, 6.7 per cent of the total Government budget was allocated to health. By the mid-1940s, however, Government expenditure on health had decreased to less than 4 per cent of the total (Palestine Government, 1946, Vol. II, p.630).

The priority of the Government was to concentrate on public health and sanitation and the prevention of disease. Malaria was endemic throughout Palestine and the British considered it, 'the principal danger to the health of the people and the gravest obstacle to the development of the country' (Report of the first High Commissioner, 1925, cited in Palestine Government, 1946, Vol. II, p.699). From the outset, therefore, (and following the example of the British army during its staged advance through Palestine), the Department of Health directed substantial resources towards the control and treatment of malaria. Details of the anti-malarial work are given in *A Review of the Control of Malaria in Palestine (1918-1941)* (Palestine, DH, 1942) and focused on anti-larval measures and the provision of quinine. In the towns, wells and cisterns were closed, mosquito-proofed, or oiled and piped water supplies were improved or introduced. The rural campaign commenced in 1919:

> Two fundamental principles soon became clear: the organisation of a medical staff on such a basis that malaria should receive an intimate, detailed and expert attention in all areas, and the necessity of full co-operation from the public concerned.
>
> District medical officers began to be appointed. Their task was not solely confined to malaria: they combined the treatment and control of this disease with many other duties, with the general control of disease in their areas. They were authorised to employ antimalarial inspectors and other personnel. It was the duty of the former to give their main attention to this one condition, and to cover each village under their jurisdiction twice a month if possible, giving particular attention to districts suspected of being heavily infected. As early as 1920 medical officers began village visitation on a routine basis. All breeding places began to be recorded and oiled; cisterns to be provided with mosquito proof tops: permanent collections of water to be inspected and numbered.
>
> …By 1922 the Department of Health had its rural scheme in full operation… (Palestine, DH, 1942, p.18)

The success of the malaria control measures is indicated by data for proportions of populations with enlarged spleens - the spleen rate. In Jerusalem, the spleen rate fell from 44.3 per cent in 1919-20 to 0.8 per cent in 1925; the corresponding drop in Jaffa was 16.6 to 4.9 per cent and that in Haifa, 39.0 to 5.7 per cent Palestine, DH, 1942, p.21). In 1925, the spleen rate was 5.3 per cent among urban school children and 12.0 among their rural counterparts; by 1944, the rates were 0.8 per cent in urban areas and 4.3 in rural areas respectively (Palestine Government, 1946, Vol. II, p.701). Also, between 1922 and 1944 the number of patients treated at dispensaries increased five-fold but the percentage of patients who were treated for malaria fell from 7.2 per cent to 0.7 per cent (Palestine Government, 1946, Vol. II, p.700). Furthermore, the malaria prevention and treatment programme may have had a substantial impact on child mortality because malaria may

Table 3.8 Hospitalisation rates in 1943 and distribution of patients by type of institution in 1944 by population group, Palestine

	Hospitalisation rates, 1943		
	Muslims	Christians	Jews
Patients hospitalised			
per 1000 population	25.3	51.2	58.1
per 1000 urban population	37.2	53.5	56.4
per 1000 rural population	19.0	32.7	60.0
Maternity cases hospitalised per 100 confinements	1.7	21.9	86.0
Men hospitalised per 100 women			
Under age 1	340	209	95
All ages	175	146	78

	Distribution of patients by type of institution, 1944					
	Per 100 admissions to hospitals			Per 100 outpatients treated		
	Government	Jewish	Non-Jewish	Government	Jewish	Non-Jewish
Jewish patients	8.6	69.7	21.6	1.6	97.0	1.4
Non-Jewish patients	53.5	2.4	44.1	54.7	5.2	40.1
All patients	29.7	38.2	32.1	13.0	77.3	9.7

Source: Bachi (1977), pp. 234 & 235.

have been the underlying cause of many of the deaths reported as deaths from pneumonia. Certainly, it was believed at the time that, 'a great deal of the mortality of pneumonia is due to post-malarial anaemia and debility' (Palestine Government, 1922, p.65).

Another preventive health measure introduced by the Department of Health was the use of vaccinations. Smallpox vaccination was legally required within three months of birth and children entering Government schools were re-vaccinated. Typhoid, cholera and plague inoculations were administered when epidemic conditions required it. However, these diseases killed only a small number of children (Table 3.4).

For the government, the provision of hospital services was a lower priority than the prevention of infectious disease and was limited to hospital accommodation for infectious diseases and for general medical conditions among restricted sections of the population such as civil servants, and to facilities in areas of the country not served by voluntary medical institutions. Nonetheless, between 1921 and 1944 the number of government hospital beds increased from 304 to 1377. Over the same period, the number of beds in Jewish institutions increased from 402 to 1410 and the number of beds in other missionary, charitable and private institutions rose from 782 to 1379 (Palestine Government, 1946, Vol. II, p.615). As Table 3.8 shows, marked differentials existed in the use of these services by population group. Christians and Jews were twice as likely to

be hospitalised as Muslims and, whereas for Jews urban residence brought no advantage, rural Muslims were only half as likely to be hospitalised as urban Muslims. Most notably, giving birth in hospital was almost unknown amongst Muslims.

The majority of Jews were served by non-governmental Jewish institutions (Table 3.8). A few additional statistics, taken from Bachi (1977), Great Britain, NI (1943) and Palestine, DS (1944) provide further evidence of the disparities in health care provided for the Arab and Jewish populations:

- The number of Jewish physicians per 10,000 Jewish population increased from 23.6 in 1922-24 to 45.9 in 1937-39. In the same period the number of Arab doctors per 10,000 Arab population decreased from 3.0 to 2.5. (These figures compare with 10.6 physicians per 10,000 population in Great Britain in 1940.)
- In 1939 the Government Department of Health maintained 34 infant welfare centres and supported two others. There were three centres run by voluntary committees for Arab children and 47 centres for Jewish children. The 50 centres served a total of 18,444 infants of whom 10,321 were Jewish. The number of Jewish children born in Palestine in 1939 was 9,888. There were about 43,000 Arab births in the same year.

The anti-malarial activities initiated by the British were continued by the new Israeli government. The elimination of this public health hazard was soon completed. In 1949, the (incomplete) number of reported malaria cases per 10,000 population was 10.3, in 1950 it was 7.1 and in 1955 it was 0.5 (Bachi, 1977, p.241). The overwhelming majority of cases in later years were imported infections (Israel, CBS, 1971, SAI, p.100). The Israeli Ministry of Health also established an immunisation programme. The earliest figures indicate that by 1965 90 per cent of infants and 4 per cent of two-year olds received three doses of DPT vaccine (Israel, CBS, 1987, SAI, p.659) but coverage rates for the Jewish and Arab populations are not published separately.

The high priority given to health by the Israeli state resulted in the continued expansion of all types of health services. In 1960 there were already 589 mother and child health (MCH) centres; by 1982 the number had reached to 932 (Israel, CBS, 1987, SAI, p.657). The provision of such services for the Arab population lagged behind that for the Jewish population. The first MCH centre in an Arab locality was opened in 1954. By 1960, the number had risen to 40, - 7 per cent of the total (Grushka, 1968, p.164). In the same year, 20 per cent of all births were to Arab women.

Another development with far-reaching implications for Arab welfare was that, for the first time in 1959, Arab workers were admitted to the Histadrut, the Hebrew Workers' Union. According to Lustick (1980, p.96),

> The single most important factor involved in the growth of Arab membership has been the desire by Arabs to become eligible for Kupat Holim, the Histadrut's reasonably priced, comprehensive health program.

Soon after, the Kupat Holim and two other sick funds began to open curative clinics in Arab localities. By 1964, there were a total of 79 clinics (government and sick fund) and 56 MCH centres, served by 42 physicians and 147 nurses, in Arab towns and villages (Grushka, 1968, p.167).

All the evidence suggests that, contrary to the expectations of some Israelis, Arabs placed a high value on Western medical care and continued to demand better access to health services. Limited household resources were diverted to paying for health priorities. Thus, by 1960, 55 per cent of Arab births took place in hospital and by 1980, when most deliveries were covered by health insurance, the figure reached 99 per cent (Israel, CBS, 1987, SAI, p.659). The comparative figures for Arabs (Muslims and Christians combined) in 1943 and for Jews in 1960 were 3 and 99 per cent respectively (Palestine, DS, 1944, p.364). Although impossible to prove, it would be very surprising if the growing availability of medical care did not play a significant role in the reduction of Arab child mortality in the early years of Israeli rule.

Water and sanitation

In addition to the malaria control measures discussed already, the Palestine government sought to improve water supplies and sanitary conditions. The Department of Health monitored water quality and sanitary developments in the towns and the Department of Public Works advised the sanitary engineers in the municipalities. The existing, 'incomplete and unsatisfactory' municipal piped water supplies in Tel-Aviv, Gaza, Beersheba, Hebron, Ramleh, Tulkarm, Jericho, Nablus, Acre, Tiberias and Safad were all upgraded and/or extended during British rule (Palestine Government, 1922, p.77 and DH, various years). Most of these local authorities also made substantial progress in developing local sewerage systems and connecting households to sewers (Palestine, DH, various years). For example, during British rule the Gaza Municipality gradually extended its piped-water supplies and sewage lines to serve an increasing number of households in the town.

Of the 3 large towns, Jerusalem had the best services at the end of the Ottoman period and subsequently benefited from its position as the Mandate government's administrative centre. In 1918, the British army installed a major water network in Jerusalem (Palestine Government, 1922, p.77). According to Dumper (1997, p.146):

> Drains were cleared, refurbished, covered and regularly inspected. By the mid-1920s, Jerusalem had acquired the reputation of a healthy city and environment compared to the previous state of affairs and to conditions on the coastal plain.

Later developments included the provision of piped water supplies and sewage drainage systems for the new suburbs outside the city wall and, more notably, improvements to the existing water and sewage systems in the old city where the majority of the poorest inhabitants resided (Dumper, 1997).

In contrast, when the British arrived, neither Jaffa nor Haifa had a public water supply. In Haifa private well water was invariably polluted but the deep wells in most parts of Jaffa yielded potable water (Palestine, DH, 1922, p.56). According to the Department of Health Reports, both municipalities made gradual progress in water provision, the building of sewers and sea outfalls, and household connections to the systems but developments failed to keep pace with the rapidly growing populations.

From its earliest years, the Mandate government provided small loans to villages for the improvement of their water supplies (Palestine Government, 1922, p.77). Following the drought of 1934, the available funds were increased substantially and dependable water stores were considered a priority. Credits were also provided for village pit latrines (Palestine, DH, 1935). While no figures exist for the total number of beneficiaries of these projects, they probably constituted only a small proportion of the population.

Improvements in water and sanitation probably contributed to increases in Arab child survival in both urban and rural localities in Palestine. Given the limited data available, it is difficult to assess the impact of such developments in the villages. However, the differences in the levels of infant mortality between Jerusalem and Jaffa (Table 3.1) and the higher quality services in the former, suggest that good water supplies and adequate sewage disposal were particularly important in the towns. It therefore seem likely that advances in this area played a role in the reduction of child mortality in urban areas.

From its inception, the priority of the Zionist state of Israel was to promote the development of the country's Jewish sector. Jewish settlements proliferated and all received electricity, sewage systems, paved roads and water works at minimal or no cost to the residents (Lustick, 1980, p.168). According to a Jewish Ministry of Development

official responsible for the ministry's programmes in the Arab sector, 'Until 1967 essentially nothing was done by the government with regard to the development of electrical or other infrastructural facilities for Arabs.' (Lustick, 1980, p.183) Arabs living in the largest urban centres were connected to the Municipal water supplies and sewage systems improved and developed by the British but the rural Arab population depended on rain-fed cisterns, springs and wells and septic tanks. As late as 1976, only 1 of 104 Arab villages had a sewage system (Lustick, 1980, p.191). The introduction of piped water proceeded more rapidly. However, in 1968, the lack of running water was cited as one of the impediments to the opening of health centres in Arab villages (Grushka, 1968, p.163) and in 1972 only 52 per cent of Arab households had a bath or shower compared with 98 per cent of Jewish households (Bachi, 1977, p.67). Even in 1983 a large gap remained in existence between government aid to Arab and Jewish localities (Anson, 1992, p.114).

Marriage partners

The causal link between deleterious recessive genes and congenital malformations is well established and the incidence of major congenital malformations and associated early infant deaths is higher among the offspring of consanguineous marriages than among the children of unrelated couples (see, Bittles, 1994 and references therein). It is not possible to establish the trends in the proportions of consanguineous marriages in the Muslim, Christian and Jewish populations but the small studies which include information on marriages give a good indication of their relative frequency in the three population groups.

Jews are the least likely to marry blood relatives and the practice is less common among Ashkenazi than among Sephardi Jews. For example, in studies of births in Israeli hospitals conducted in 1955-57 and 1969-70, only 2 per cent of Ashkenazi mothers but about 15 per cent of non-Ashkenazi mothers were married to male relatives (Tsafrir and Halbrecht, 1972, p.344). Rosenfeld's study of one Arab village in Israel found that for both Muslims and Christians, approximately 60 per cent of marriages in 1954-63 were paternal cousin marriages (Rosenfeld, 1968, p.748). However, two other studies have shown that Christians are significantly less likely than Muslims to marry close or distant relatives. In Shafa 'Amr, 38 per cent of marriages between non-refugee Muslim couples and 21 per cent of Christian marriages during the period 1931-81 were patrilineal (Al-Haj, 1987, p.67), and a more recent survey of rural communities in the Western Galilee

found that 40 per cent of Muslim unions and 29 per cent of Christian unions were endogamous (Freundlich and Hino, 1984, cited in Al-Haj, 1987). As Bittles (1994) has emphasised, it is important to be aware that the positive relationship between consanguineous unions and infant deaths is often the consequence of confounding with other socio-demographic factors such as mother's age and economic wealth. Nevertheless, it seems likely that part of the excess of Arab neonatal deaths (Table 3.7) and part of the excess of infant deaths from congenital abnormalities (Table 3.6) can be explained by differences in the proportions of women who marry biological relatives. It is also conceivable that the same factor accounts for some of the difference between the Muslim and Christian infant mortality rates.

Mother's education

Section 2.3.2 describes the gradual increase in the number of Arab girls who attended school during the Mandate and the later, more dramatic, rise in education among the Palestinians who came under Israeli rule (Table 2.12).

The 1961 Israeli Census provides the earliest measures of differentials in the survival of Palestinian children by mother's education. The reported proportions of children who died before age 5 which are presented in Table 3.9 are equivalent to those by place of residence discussed in Section 3.2. The proportions of dead children in the Christian 45-49 group suggest that the children of mothers who had at least 5 years of schooling were about twice as likely to survive to age 5 as the children of uneducated mothers. The children of older Christian women experienced higher mortality but, again, those whose mothers had some formal schooling were less likely to have died. In contrast, the corresponding figures for Muslims provide no clear evidence of an educational gradient in Muslim child survival during the Mandate. Moreover, the figures for Muslim women aged 35-44 by years of schooling are irregular. This may be the consequence of sampling error, since very few older Muslim women attended school. Alternatively, it may reflect incomplete reporting of child deaths or age mis-statement. Despite these uncertainties, two firm conclusions can be drawn from the data relating to the Mandate period. First, since the reported proportions of dead children are lower for Christians than Muslims at all levels of schooling, only part of the difference in child mortality levels between the populations can be attributed to the higher educational status of Christian women. Secondly, the schooling of girls could only have made a negligible contribution to the substantial increase in Muslim child survival between the 1920s and the 1940s.

Table 3.9 Proportions of children born to currently married women in their first marriage who died before age 5 (per 1000 live births) by age of woman, years of schooling and population group, Israel, 1961 census

Age	Years of schooling	Deaths before age 5 per 1000 live births			Women[+]
		Muslims	Christians[*]	Total[+]	
15-19	0	133	-	119	1240
	1-4	125	-	135	425
	5+	*x*	*x*	*x*	390
	Total	141	*x*	130	2065
20-24	0	118	*x*	109	4735
	1-4	76	56	74	955
	5+	81	28	43	1420
	Total	111	32	94	7155
25-29	0	112	65	108	5115
	1-4	101	136	106	665
	5+	91	53	56	1280
	Total	110	72	100	7070
30-34	0	151	107	150	4550
	1-4	85	48	74	415
	5+	79	60	64	1000
	Total	146	74	134	5980
35-39	0	187	162	183	3335
	1-4	155	181	158	300
	5+	190	77	104	720
	Total	186	133	173	4365
40-44	0	238	161	230	2880
	1-4	456	65	172	195
	5+	221	185	177	465
	Total	241	151	223	3540
45-49	0	270	210	257	1985
	1-4	318	148	215	170
	5+	*x*	106	81	320
	Total	269	178	242	2480
50-54	0	315	247	300	2065
	Total	315	242	291	2430
55-59	0	321	199	289	1140
	Total	319	178	272	1320
60-64	0	314	352	320	1035
	Total	307	301	305	1185
65+	0	358	268	349	990
	Total	358	249	338	1115

[*] Excluding European Christians.

[+] Including European Christians, Druze and others.

x Small numbers.

Source: Israel, CBS (1966), p. 74.

Although the gradual increase in the levels of education of Muslim women did not play a significant role in the decline in child mortality during British rule, schooling did have a beneficial impact later. This is clear from the negative association between mothers' years of schooling and proportions of their children who had died among Muslim women aged 25-34 in 1961 (Table 3.9). Most of these children would have been born in Israel in the 1950s but their mothers would have passed through the primary school age range before the British left Palestine. It is important to note, however, that since 80 per cent of Arab women aged 30 and above and 60 per cent of Arab women aged 20-24 in 1961 had never attended school (Israel, CBS, 1964, p.53) and Christian girls were more likely to be educated than Muslim girls, maternal education probably had only a small overall impact on Muslim child mortality until the 1960s.

Trends in child mortality by mother's education in Israel after 1961 cannot be examined because the mortality question was dropped from subsequent censuses. The nearest comparable data are figures from linked birth and infant death registrations. The data for births in 1981-84 are summarised in Table 3.10. Ignoring the results for Christians in the 0-4 years of education group, which are based on only 182 births and 2 deaths, the figures for each of the three population groups reveal mortality gradients from the lowest to the highest educational strata in infancy, the first month of life, and the post-neonatal period. For Muslims, the risk of dying at ages 1-11 months among the children of women with 0-4 years of schooling is 74 per cent higher than the risk for children born to mothers with at least 11 years of education. In the neonatal period the difference is only 18 per cent. For Jews, the post-neonatal mortality gradient is also steeper than the neonatal mortality gradient but for Christians the opposite pattern is observed. The two other features to note in Table 3.10 are the very different distributions of births among the educational strata in the three populations and the Muslim-Christian-Jewish mortality differentials at each level of education. The mortality differentials are substantially higher after the first month of life: Muslim infants were at least twice as likely to die as infants born to Jewish mothers who attended school for the same length of time and the risks of dying for Christian infants were intermediate between the two larger population groups.

A positive relationship between mothers' level of education and child survival is the most widespread finding of studies that have examined child mortality differentials in developing countries. In most countries, the education-mortality association is appreciably stronger in childhood than in infancy and greater in the post-neonatal period than in the first month of life (see, for example, Hobcraft *et al.*, 1984). Attempts to

Table 3.10 Infant deaths per 1000 live births by age at death, population group and mother's education and father's occupation, Israel, 1981-4

		Deaths per 1000 live births			Percentage of births
		Infancy	Neonatal	Post-neonatal	
Mother's years of schooling					
Muslims	0-4	23.4	11.4	12.0	31.5
	5-8	22.3	12.0	10.4	38.7
	9-10	22.8	11.6	11.1	11.9
	11+	16.6	9.7	6.9	14.5
	Unknown	-	-	-	3.4
	Total	22.1	11.5	10.5	100.0
Christians	0-4	11.0	5.5	5.5	2.4
	5-8	18.6	10.5	8.0	26.3
	9-10	16.6	10.2	6.4	20.8
	11+	14.0	7.6	6.5	49.0
	Unknown	-	-	-	1.5
	Total	15.7	9.0	6.7	100.0
Jews	0-4	18.8	13.1	5.6	0.8
	5-8	15.6	10.5	5.0	9.4
	9-10	13.3	8.6	4.6	14.7
	11+	10.0	7.2	2.8	72.1
	Unknown	-	-	-	3.1
	Total	11.4	8.0	3.4	100.0
Father's occupation					
Arabs	Professional/managerial	16.8	10.8	6.0	7.8
	Other white collar	21.5	12.0	9.5	10.8
	Agricultural	19.8	10.9	8.9	4.0
	Skilled workers	21.3	11.7	9.6	19.8
	Unskilled workers	22.1	10.6	11.5	37.0
	Not in labour force	23.7	11.8	11.9	6.4
	Unknown	-	-	-	14.2
	Total	20.7	10.9	9.8	100.0
Jews	Professional/managerial	9.9	6.7	2.2	19.5
	Other white collar	11.2	8.1	3.1	13.2
	Agricultural	9.8	6.5	3.3	3.5
	Skilled workers	11.4	7.6	3.8	21.3
	Unskilled workers	15.3	10.3	5.0	5.8
	Not in labour force	12.3	7.7	3.6	16.9
	Unknown	-	-	-	19.6
	Total	11.1	8.0	3.4	100.0

Source: Israel, CBS (1992), pp. 34-35, 39.

unravel the complexity of this well-established relationship intensified in the 1980s. Cleland and van Ginneken's (1988) paper examined the evidence in the literature and summarised the state of the understanding of the mechanisms underlying the relationship. Female education is often a proxy for socio-economic status. Better educated women tend to marry similarly advantaged men and such couples usually enjoy a higher standard of living because of the husband's superior status occupation. Also, educated women may be less likely to give birth at the high risk ages, more likely to seek and adhere to advice

from professional health workers, and may provide more proficient care of children in the home.

All of the explanations for maternal education differentials in child mortality described by Cleland and Van Ginneken probably contributed to the mortality patterns observed for Palestine and Israel. For example, Muslim-Christian-Jewish educational differentials in Palestine may have been one factor in the variations in use of medical care in Palestine (Table 3.8) and it is likely that the shift from home deliveries to hospital births in the Arab population was led by educated women. Some of the decline in Arab infant deaths from infectious disease between the early 1960s and 1985 and the persistence of the large differential in deaths from these and external causes (Table 3.6) may also be associated with the changes and disparities in female education. However, whether educated mothers in Israel are more skilled at preventing sickness, provide a level of supervision which reduces accidents, and/or are better able to optimise on the curative health services available cannot be determined from the published data.

Socio-economic status

The term socio-economic status comprises many different aspects, which are often correlated. For example, urban residents may be more likely to be more educated or to have the highest occupational profile and this, in turn, may lead to the highest incomes. According to Owen (1988, p.25):

> There is no doubt that the Palestine economy enjoyed a high rate of growth during the inter-war period, whether measured in terms of foreign trade, government revenue or industrial output. … However, it is also clear that this advance was due largely to the peculiar feature of Jewish immigration and large Jewish capital transfers, most of which went to create special enclaves where the inhabitants were able to develop a much higher standard of living than the rest of the population. In what are admittedly very rough estimates by Gross and Metzer, Jewish income per capita increased from around £P 20 in 1923/4 to perhaps £P 50 in 1935. .. a first estimate for Arab income per capita gives this as £P 17 in 1936. (References omitted.)

There is evidence to suggest that the *fellahin*, but perhaps not the Arab urban elite, experienced considerable hardship until the Second World War. The country had ceased to be self-sufficient in cereal production at the end of the 19th century and importation of food, especially wheat and flour for bread making and barley for animal fodder, was necessary throughout the Mandate. Government efforts to commercialise agriculture and make Palestine a source of cash crop exports (principally citrus) and the encouragement of Zionist settlement led to the growing impoverishment of the peasantry (Smith, 1984). Because of land shortages, taxes payable in cash and increasing debts, many peasant families sent sons to find work in the expanding coastal cities. But wages for unskilled

Arab labourers were only one third to one half those of Jewish labourers. By contrast, although the urban-based Palestinian bourgeoisie suffered as a result of the more advanced organisation and technical skills of Zionist enterprise and labour, it benefited from increased trade and from employment in the British administration.

The Second World War was a major boost for all parts of both the Arab and the Jewish sectors of the economy with the greatest expansion in the industrial sector. Between 1939 and 1945, average industrial earnings are estimated to have grown by 200 per cent for Arabs and 258 per cent for Jews while those of unskilled construction workers increased by 329 and 405 per cent respectively (Palestine Government, 1946, Vol. III, p.1309). In the same period the cost of living rose by 154 per cent. By 1945 about one-third of the male Arab work force was employed in wage labour (Taqqu, 1980, p.267). Cereal production in 1940-42 was about 25 per cent above 1935-39 levels, but by 1945 it had fallen back to the pre-war level (Owen, 1988). Vegetable production doubled between 1939 and 1945. Agricultural income increased by 400 per cent between 1939 and 1944/5 (Palestine Government, 1946, Vol. I, pp.365-67) and in 1944 Arab income *per capita* was £P 165 (Owen, 1988, p.26).

The occupational structures of the Muslim and Christian populations in Palestine were very different. In 1931, 63 per cent of Muslim earners but only 16 per cent of Christian earners were engaged in agriculture and the corresponding figures for the 3 professions of law, medicine, and religion were 1 per cent and 6 per cent respectively (calculated from Mills, 1933b, pp.282-299). Moreover, because the Mandate authorities tended to favour the Christian community, particularly in regard to employment (Graham-Brown, 1980), the Christians were disproportionately represented in law enforcement, public administration and teaching. Thus, 11 per cent of Christians but less than 3 per cent of Muslims were employed in these public sector positions.

The different occupational structures of the Muslim and Christian populations probably account for some of the urban infant mortality differentials observed for the Mandate period (Table 3.1). The largest concentration of the Muslim middle class was in Jerusalem where Muslim infant mortality was lowest. (And the relatively small improvement in infant morality among Muslims in this town may reflect the arrival of poorer families from Hebron. These migrants moved into the old city properties vacated by Jews when the latter relocated to better housing in the suburbs in the 1930s and 1940s (Dumper, 1997)). Unlike in Jerusalem, there were relatively few government employees in Jaffa and Haifa and the Muslim elite in these places were greatly outnumbered by

families in the lowest occupational strata. In the smaller towns, where infant mortality levels were similar to those in Jaffa and Haifa, the occupational structure was less polarised with few Muslims engaged in the highest status occupations but also a limited number dependent on the least secure, unskilled casual types of employment.

In contrast to the Muslim population, Christians in all the large towns undoubtedly benefited from their contacts with European traders and the numerous religious institutions. In addition, proportionately few were engaged in menial jobs (Mills, 1933b). Thus economic factors are probably part of the explanation for the lower Christian infant mortality rates in Jerusalem, Jaffa, Haifa, Acre, Ramleh and Nazareth. However, there is no evidence that in the other towns Muslims had an economic advantage which could account for their lower infant mortality up to the mid-1930s. Although there may have been differences between the populations in these areas in the completeness of death registration, the reported infant mortality rates could reflect real differences in mortality levels. In this case variations in childrearing practices would be most the likely explanation. For example, it is possible that, unlike their Muslim counterparts in the small towns and Christian mothers in the villages, Christian mothers in the small towns had shifted from prolonged breast feeding to bottle feeding their infants. Christian mothers in the large towns are likely to have adopted the same infant feeding practices but, as a result of their closer contact with Europeans and their institutions, they may also have acquired the skills of hygienic milk and food preparation.

The published 1961 proportions of children who died before age 5 by husband's occupation are presented for Muslims and Christians combined. These figures provide little conclusive evidence of occupational differentials in infant mortality during the Mandate. The figures show the highest mortality among the children in the 'Unknown occupation' category followed by the children of farmers among whom there were 313, 306 and 317 reported child deaths per thousand live births to women aged 45-49, 50-54 and 55-64 respectively (Schmelz, 1974, p.75). There are large fluctuations in the proportions of dead children in the other occupation groups: for the offspring of men in the 'liberal professions' the figures are 234, 362 and 281 and for children of construction workers they are 252, 268 and 105 deaths per thousand children born to women aged 45-49, 50-54 and 55-64. The proportions of dead children in the remaining category, the 'Other occupations' group are lower than in the farming group but they do not differ systematically from the figures for the children of 'liberal professionals' and construction workers.

One problem with the 1961 mortality data by father's occupation is that they do not include information on the children of widowed women. Equally important is the fact that the 1961 occupation distribution is an imperfect representation of the distribution of the families of children born in Palestine in the 1930s and 1940s. In particular, because of the upheaval in 1948 and displacement from the land within Israel, the occupation of many fathers would have changed after their children had passed their fifth birthdays. However, the surprising finding is that the children in the highest occupational stratum, the liberal professions, do not appear to have had consistently lower mortality than the children in other families. This may be a real finding and reflect the experience of the small section of this segment of Palestinian society who did not leave the area which became Israel in 1948. Alternatively, it could be the result of differentials in recalling vital events in the distant past or of the small numbers of women on which the figures are based.

The late 1950s and early 1960s saw a large increase in Arab employment in the Jewish sector. This was the period of greatest economic growth in Israel. Between 1950 and 1961, *per capita* GNP in the country increased at an average rate of 5.2 per cent per year (Calculated from: Israel, CBS, 1987, SAI, p.175). Estimates of Jewish/Arab wage differentials vary but, as Ben-Porath (1966, p.81) points out, the fact that the *mahr* or bridewealth paid by Arab families rose more rapidly - by 8.8 per cent per year between 1950 and 1961 - than *per capita* GNP would appear to indicate that the income gap between Jews and Arabs narrowed between 1950 and 1961. It is certainly reasonable to assume that most Arab families experienced an increase in the money available for purchasing food and it would be surprising if the increased prosperity did not contribute to the substantial decline in Arab child mortality in the 1950s.

Table 3.11 provides a comparison of Arab and Jewish occupational distributions in 1963, 1972, and 1983. As commentators such as Zureik (1979) and Lustick (1980) have observed, Jews are concentrated in high status and white collar occupations and most Arabs have low status jobs. Even by 1983, only 19 per cent of Arabs were employed in professional, managerial, and clerical jobs compared with 51 per cent of Jews. Put more stridently, 'They [Arabs] are subordinate to Jews in every aspect of social and economic status, such as education, occupation, income and political power.' (Semyonov, 1988, p.258). Of interest here is to what extent the occupational differentials between the two groups can explain the difference in child mortality levels and how much of the decline in Arab child mortality is attributable to Arab progression up the employment hierarchy.

Table 3.11 Occupational distribution of employed Arabs and Jews, Israel, 1963, 1972 and 1983

	1963		1972		1983		
Occupation	Arabs	Jews	Arabs	Jews	Arabs	Jews	Occupation
Professional, scientific & technical	5.5	12.9	6.6	17.6	2.6 9.6	8.7 15.9	Scientific & academic Other professional
Administrative, managerial & clerical	2.0	16.8	3.9	19.0	1.4 5.3	5.1 19.8	Admin. & managerial Clerical
Sales	4.7	8.4	8.2	8.4	7.6	7.9	Sales
Service	6.2	12.5	10.0	12.4	10.6	12.0	Service
Agriculture & related	38.0	11.8	19.9	6.9	10.0	4.4	Agriculture & related
Transport	4.3	5.5	6.6	5.0			
Other manual	39.3	32.1	18.4 26.4	24.0 6.7	41.0 11.9	23.3 2.9	Skilled manual Unskilled manual
Total	100.0	100.0	100.0	100.0	100.0	100.0	Total

Sources: Ben-Porath (1966), p.22; Zureik (1979), p. 123; Israel, CBS (1984) SAI, pp. 348-350.

Conclusive answers to these questions cannot be elicited from the published data. The mortality proportions for children born to mothers under age 45 in 1961 are erratic but suggest that mortality in all occupational groups declined in the 1950s. In general, children with fathers in the liberal professions experienced the lowest mortality, and the differences in survival between the children of construction workers and the children of farmers were small. For example, among women aged 30-34 in 1961 there were 104 child deaths per thousand births to the wives of liberal professionals and the corresponding figures for the construction and agriculture groups are 135 and 146 respectively (Schmelz, 1974, p.75).

By the early 1980s, no doubt at least in part because of improvements in occupation registration, a clearer pattern emerges. The children of Arab unskilled and unemployed men were twice as likely to die at ages 1-11 months as the children of male managers (Table 3.10). Children in the other white collar, agriculture and skilled groups experienced risks of dying about half way between those of the most advantaged and disadvantaged. In contrast, the differences in the neonatal period were small. The occupational differentials in Jewish child mortality are similar to those for Arabs. However, comparing between the two populations, in each occupational group Arab neonatal mortality was about 40 per cent higher than Jewish neonatal but in the post-neonatal period Arab mortality was between 2 and 3 times higher than Jewish mortality.

Data on mortality differentials by other aspects of socio-economic status are not available but the disparities in living conditions between Arab and Jewish households are

Table 3.12 Housing densities and possession of consumer durables by population group, Israel

A. Percentage of households with more than two persons per room

	Arabs			Jews		
	Urban	Rural	Total	Urban	Rural	Total
1961	70	87	83	38	49	40
1968	-	-	61	-	-	16
1973	-	-	59	-	-	11
1983	-	-	46	-	-	4
1986	-	-	41	-	-	4
1986	40	43	41	4	3	4

B. Percentage of households with specific consumer durables

	Refrigerator		Washing machine		Private car	
	Arabs	Jews	Arabs	Jews	Arabs	Jews
1959/60	1.5	44.1	0.2	13.3	-	-
1965	8.2	83.6	2.4	30.7	-	8.2
1970	26.8	95.5	11.8	46.1	3.1	16.7
1974	53.8	98.3	27.8	64.5	11.5	27.6
1981	90.8	99.5	43.7	82.0	13.3	35.6

Sources: Ben-Porath (1966), p. 76; Israel, CBS (various years) SAI.

indicated by the comparative figures presented in Table 3.12. Conditions conducive to the spread of infectious diseases include overcrowding, lack of a readily accessible and clean water supply, and the storage of food at room temperatures. The number of persons per room is consistently higher in Arab households. By 1960, which marked the end of the steep decline in Arab child mortality, only 2 per cent of Arab households possessed a refrigerator compared with 98 per cent of Jewish households. No data on water supply and toilet facilities are available but it can be inferred from the ownership of washing machines and the fact that, in 1974, only 52 per cent of Arab households had a bath or shower compared with 98 per cent of Jewish households (Bachi, 1977, p.67) that Jewish households were also advantaged in this respect.

3.4 Summary

In the period 1925-45, Jews were more likely than Arabs to be characterised by those distal determinants associated with lower mortality. These included higher socio-economic status, better maternal education and better access to, and use of, health services. Jewish infants were less likely to be malnourished and, although no data are available on sanitation, their higher socio-economic status would suggest that they also

fared best in this respect. Christians occupied an intermediate position while Muslims were characterised by the poorest indicators with respect to these variables. This ranking of the distal determinants parallels the infant and child mortality rates in this period, whereby Jews had the lowest mortality, followed by Christians and then Muslims. The causes of death with the biggest differential ratios suggest those areas with the most scope for improvement. This was the case for diarrhoea much more than respiratory infections.

There are no clear indications to explain the evolution of the differentials in mortality over time (that is the pattern of decrease with each population group). However, the similarities in the mortality declines among Muslim villagers and the Muslim inhabitants of most towns, and the high infant mortality among the Christian residents of the smaller towns suggest that maternal education played only a minor role in the increases in Arab child survival during the Mandate. Other factors must have contributed to the changes in mortality levels over time. Although the evidence is not conclusive, these are likely to have included public health measures including malaria control, medical technologies such as smallpox inoculation, better nutrition, and improved access to child welfare and medical services.

CHAPTER 4

THE GAZA STUDY: METHODOLOGY AND DATA

The first objective of this chapter is to describe the tools employed to collect and analyse demographic data on the populations of ash-Shati and ash-Shajaʻiyya. Section 4.1 outlines each stage of the survey process from the selection of the sample through to conducting the fieldwork. The next part, Section 4.2, describes the demographic techniques that are used to estimate levels and trends in fertility and child mortality and the models that are applied to examine differentials. The second objective of this chapter is to assess the quality of the data collected in the survey. This is done in Section 4.3.

4.1 The survey

The most detailed plan of Gaza city available was a 1:2500 map produced by the Gaza Municipality at the end of the 1970s.[10] Since the only way to obtain a reasonably accurate sampling frame was to pace the streets, it was decided to confine the survey to two areas of the city. These were ash-Shati refugee camp and one quarter of old Gaza, ash-Shajaʻiyya. The latter was chosen at random from the four earliest inhabited neighbourhoods. The aim was to compare the experiences of indigenous Gazans with those of the refugee camp residents. The differences between ash-Shati and ash-Shajaʻiyya are highlighted in Chapter 5.

The communities surveyed are not representative of the city's entire population. Specifically, the survey does not cover those refugees who have moved out of the camp as a result of force or financial incentives from the Israeli authorities, or those families from both ash-Shati and ash-Shajaʻiyya who have moved to al-Rimal, the wealthiest neighbourhood in the town.

[10] The official who provided the map requested that his name, department and the date of the map be withheld.

4.1.1 The sample

According to UNRWA, there were 38,424 registered refugees in ash-Shati camp at the end of June 1984 and 40,359 at the end of June 1985 (UNRWA, 1984 and UNRWA, 1985). However, since deaths are under-reported (Weller and Serow, 1986) and the registered population includes an unknown number of persons residing outside of the camp boundaries and abroad, the actual number of persons living in the camp was probably somewhere between 30,000 and 35,000 at the beginning of 1985.[11] Estimates of the population of ash-Shaja'iyya are equally rough and figures of between 35,000 and 45,000 were quoted by Gaza Municipality officials and other informed individuals. The most precise figure obtained was from the statistics office in the Labour Force Department of the Gaza Civil Administration. An employee in this office said the population of ash-Shaja'iyya was 37,905 in mid-1986.[12]

In the absence of both reliable population estimates and sampling frames, it was decided to survey 500 dwellings in each community - roughly ten per cent of the total. Using a 1974 1:2500 UNRWA map of ash-Shati and the Gaza Municipality map, the two neighbourhoods were paced out and divided into clusters of approximately one hundred dwellings each. A random sample of five clusters was selected from each area. More detailed sketch maps were subsequently made of the selected clusters. A sixth cluster was chosen for ash-Shati when it became apparent that the average number of dwellings in the first five units was somewhat less than 100.

4.1.2 The questionnaires

Three sets of schedules were used to collect the data for the Gaza study. The questionnaires are presented in Appendix C. Most of the questions included in the household and individual woman's questionnaires were modelled on those contained in the World Fertility Survey household and individual schedules (see, for example, Jordan,

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[11] At the beginning of 1989, for example, UNRWA records show there were 43,086 registered refugees in ash-Shati camp but an UNRWA official estimated that there were only 36,000 persons living in the camp (al-Madani, 1989, pp.37-38).

[12] The CBS Labour Force Survey of Gaza is conducted from this department. The Palestinian who provided the information asked not to be identified. He reported that there were 2642 households in Turkaman and 2773 in Jadaida, the two sub-quarters of ash-Shaja'iyya. His figure for the number of inhabitants assumes an average of seven persons per household. The published estimate of the number of persons per household in the Gaza Strip in 1986 is 6.45 (Israel, CBS, 1987, SAI, p.714).

DS, 1979a). The questions about the use of contraception and those included on the schedule for children born in the three years prior to the survey, are modifications of questions asked in a 1981 study of three Palestinian villages (Giacaman, 1988).

The definition of household used in the survey was 'those persons who live in one dwelling unit and cook and eat together'. Information about housing conditions and basic amenities, together with data on place of origin, age, sex, marital status, education and income, was collected in the household schedule. Questions on residence ('usually resides here' and 'slept here last night') were included to permit the enumeration of both the *de facto* and the *de jure* populations. The *de jure* population is used for the denominators of all demographic measures. It is defined as all persons who live at the address for at least six months of the year, students studying in the West Bank or Israel and individuals who work and sleep in Israel or the West Bank but return to Gaza at the weekend. The household questionnaire was completed by the household head or, if he/she was not present, by another responsible family member. For every ever-married woman aged 10-50 this respondent was asked to report the number of sons and daughters who were born alive, the number who had since died, and the date of the last live birth (and if dead, age at death).

A maternity history was collected from every ever-married woman aged 10-50 enumerated in each household. For each pregnancy, from the first to the most recent, questions were asked about date of termination of pregnancy and the outcome. For each live birth the sex of the child was ascertained. If the child died, the age at death was determined. Ages at death were recorded in days and weeks up to one month, in months up to 24 months, and in complete years thereafter. Questions on infant feeding and contraceptive use were also included on the individual woman's questionnaire.

The third schedule, the child questionnaire, was completed for every live birth, which occurred within 36 months of the interview. Mothers were asked to provide information about antenatal and postnatal care, including vaccinations. They were also asked a series of questions designed to establish whether the child had suffered from diarrhoea during the two weeks preceding the survey and what action was taken.

4.1.3 Training of interviewers

The original plan was to engage an equal number of male and female interviewers to work in mixed pairs. It was intended that the men would complete the household questionnaires while the women were interviewing the mothers. However, the researcher

was advised that it is socially unacceptable for Gazan women to be seen alone with a man who is neither her brother nor her husband. It was decided that an all-female team was preferable to an all-male team. Ten women, all of whom had received some post-secondary education, were recruited.

A five-day training programme was held during which the researcher and a member of Birzeit University Community Health Unit with experience of conducting health interviews in the West Bank explained the aims of the survey and interviewing techniques. The importance of obtaining accurate age and date data was emphasised. An 'Event Calendar', similar to the chronology presented in Table 1.2, was provided to help the interviewers and interviewees to locate vital events.

4.1.4 Pilot survey

The interviewers spent two afternoons of the training period using the draft questionnaires to conduct interviews in non-sample households. On these schedules, the upper age limit for fertility questions was 49. This pilot phase revealed substantial heaping of women's ages on exact age 50 although it was not obvious that the interviewers were deliberately rounding the ages of women up to age 50 in order to reduce the number of women eligible for the individual questionnaire. Nevertheless, the age range for individual questionnaires was extended to 50 in an attempt to reduce the bias resulting from any such tendency. Data collected from women aged 50 were subsequently discarded. A modification was also made to the phrasing of the questions on contraception. Two other problems became apparent during the testing of the questionnaires. First, there was some confusion between infants who died within a few hours of birth and stillbirths. The interviewers were therefore instructed to ensure that all infants who died within 24 hours of birth had shown signs of life such as crying or movement. Secondly, the pilot survey confirmed that residents in ash-Shati and ash-Shaja'iyya, like other Palestinians, tend to report their age as the nth year of life entered, that is Western/demographers' age plus one. For this reason, the interviewers were told to ask respondents (or their proxies) for their age last birthday.

4.1.5 Fielding the survey

All the interviews were conducted between April and June 1985 (see Table 4.1). The daily discussion of the interviewers' observations and suggestions resulted in the preparation of two supplementary calendars. One chart indicated the month during which the religious fast Ramadan occurred in each calendar year, the second listed the seasonal

Table 4.1 Fieldwork timetable

March – 15 April	Mapping of ash-Shati and ash-Shaja'iyya, recruitment of interviewers
15-19 April	Training of interviewers, pilot survey
20-21 April	Printing of questionnaires
22 April – 18 May	Survey of ash-Shati
20 May – 13 June	Survey of ash-Shaja'iyya

availability of vegetables and fruits. Another useful observation shared by one of the interviewers was that, because of their interest in the astrological 'star' sign of their siblings and parents, teenage girls were often able to provide dates of birth for many family members.

The researcher checked through every completed questionnaire at the end of each day. When necessary, interviewers were required to return to households to clarify inconsistencies in the collected data. The researcher accompanied the interviewers to the field each day to direct them to the eligible households and deal with any problems, which they encountered. The fieldwork proceeded smoothly and only one woman refused to be interviewed. The greatest difficulties encountered were explaining to women in non-sampled households why we were not visiting them and the upsetting effects on the interviewers' stomachs of drinking tea, coffee and/or carbonated drinks in every home which they entered.

4.1.6 Data processing

The information collected was transferred to coding sheets. Data entry was commenced at Birzeit University and completed at the London School of Hygiene and Tropical Medicine. The following statistical packages were used at different stages of the data editing and analysis: SIR, SPSS, GLIM and Excel.

4.2 Estimation procedures and models

4.2.1 Fertility

Direct and indirect techniques

The survey was designed to provide two relatively independent sets of data for estimating both fertility and child mortality levels. Vital rates may be calculated *directly* from the detailed information on all events collected in the maternity histories or indirectly using

techniques to derive fertility and mortality estimates from the summary birth and death data elicited in the household schedule.

When the numerators for age-specific fertility rates are obtained from vital registration data, the calculation of fertility rates is straightforward. If the data available come from a retrospective survey or census, deriving the denominators for rates for periods bounded by the survey date, for example 0-12 months before the survey, is easier than calculating person-years of exposure in calendar years. However, women aged x to x+5 years at interview who experienced a birth in the twelve months preceding a survey are, on average, six months younger at the time of delivery. For example, women aged 15.00-19.99 years at interview were 14.50 to 19.49 years when they gave birth. The Gaza survey age-specific fertility rates are calculated from the births in the past year to women aged x to x+5 years at survey but the figures presented here have been adjusted to correspond to the conventional age groups using the formula suggested by Hill (1985, p.174):

$$f(a)^{*} = f(a) - (0.05 \times f(a\text{-}1)) + (0.05 \times f(a\text{+}1)) \qquad (4.1)$$

where $f(a)$ are the age-specific fertility rates for the seven age groups 14.50-19.49 through 44.50-49.49;

and $f(a)$* are the rates for the conventional age groups (15.00-19.99 through 45.00-49.99).

For the first and last age groups, $f(a\text{-}1)$ and $f(a\text{+}1)$, respectively, are zero.

The advantages of using the detailed information collected in birth histories to derive period fertility rates for women grouped by age at interview have been recognised and exploited. The simple but effective procedure devised by Hobcraft, Goldman and Chidambaram (1982) facilitates the detection of changes in the quantum or tempo of childbearing. Cohort-period fertility rates are calculated. In this instance, a cohort is defined by five-year age group at survey and the periods which go back in time from the survey are each of 60 months duration. Cohort-period rates are not comparable with age-specific fertility rates. For example, in the period 5-9 years before survey, women in the 30-34 cohort were aged between 20 and 29 and the fertility rate summarises their childbearing experience during this ten-year age interval. Since the midpoint of the age interval is 25 it is convenient to refer to the rate as a rate *centred on* age 25 (Goldman and Hobcraft, 1982, p.13). How the level of fertility indicated by this particular rate compares with, for example, the level for the adjacent older cohort when they were the same age is

revealed by examination of the rate for the 35-39 cohort in the period 10-14 years prior to the survey.

The most widely-used indirect technique for evaluation and adjustment of data on recent fertility is the P/F ratio method. Originally developed by Brass (1964), it has been refined by other demographers. A comprehensive description of the development and application of the P/F method is given in the UN's (1983) *Manual X*. Reported lifetime and current fertility are compared. When inconsistencies are identified, a correction factor for adjusting the observed age-specific fertility rates can be derived. The underlying assumptions of the method are that the *age pattern* of childbearing indicated by the reported age-specific fertility rates is correct and that the best estimate of the *level* of fertility is provided by the reported mean parities for young women. In the first step, seven P/F ratios are calculated. The P values are the average parities for all women in the seven age groups 15-19 through 45-49. The F values are synthetic measures of cumulative fertility. These are derived by summing the reported age-specific fertility rates up to the age corresponding to the comparable P value. In this step, interpolation using a model of the age distribution of childbearing is necessary. Additionally, when age-specific rates are computed from births in the 12 months preceding a survey to women aged x to x+5 years at the time of the survey, an adjustment must be made to allow for the fact that the women were, on average, six months younger at the time of delivery.

In conditions of unchanging fertility and perfect recording of ages and events, the P/F ratio for each age group is equal to unity. In this case, the reported age-specific rates adjusted to correspond to the conventional five-year age groups represent the true level of fertility. Irregularities in the ratios require interpretation. In the absence of contradictory evidence, deviations from unity in the ratios for young women indicate systematic errors in the dating of the most recent live birth. The ratios for older age groups are affected by both this phenomenon and any imperfection in the reporting of lifetime fertility by older mothers. Having identified those ratios which are distorted only by the reference period error - usually those for the groups between ages 20 and 30 or 35 - the seven observed period fertility rates are adjusted to the level of fertility indicated by the reported mean parities for these two or three young age groups. Thus, the final calculation entails multiplying the reported rates by the average of the two or three most reliable ratios. There are at least two other factors that can affect P/F ratios. The first is misreporting of age. The second is changing levels of fertility. The latter is usually easier to detect. In conditions of falling fertility, for example, the ratios increase for successively older age

groups. This is because recent, lower fertility is a greater component of the P values for younger women.

The investigation of fertility trends is made simpler by the computation and comparison of cumulative cohort and period birth rates. Thus the method is essentially an adaptation of the conventional P/F ratio technique. The P values constructed from cohort-period rates are the average parities of cohorts at the end of each period. The cumulative period rates - the F values - represent the mean parities that a synthetic cohort would achieve at different ages if it were to experience the rates observed in a given period. For example, the P value for the 20-24 cohort at the end of the most recent period is simply the sum of the rates centred on age 20, age 15 and age 10 in the periods 0-4, 5-9 and 10-14 years before survey respectively, multiplied by five. The equivalent F value is five times the sum of the rates centred on the same ages in the period 0-4 years before survey. The ratio of these two figures shows how the actual number of children born to women aged 20-24 at interview compares with that of the synthetic group of women up to and including 24 year-olds during the five years leading up to the survey.

The method is readily adapted to investigate trends in fertility by duration since marriage and duration since motherhood (see Hobcraft *et al*., 1982). A duration based investigation has the potential to reveal features of family formation which are masked by cohort-period rates computed for age cohorts which include single as well as ever-married women. The analyses presented in Section 7.3 are done for age cohorts and by duration of motherhood.

The proximate determinants model

Bongaarts' model of the proximate determinants aims to provide an approximate estimate of the impact of the intermediate variables on fertility at the population level. A modified version of his original model is applied to the Gaza data. This is:

$$TFR = TF \times C_{em} \times C_{diss} \times C_c \times C_i \times C_s \qquad (4.2)$$

where TFR is the total fertility rate;

TF is the total fecundity rate;

C_{em} is an index of nuptiality (ever-marriage);

C_{diss} is an index of marital dissolution;

C_c is an index of contraception;

C_i is an index of postpartum infecundability;

and C_s is an index of spousal separation.

The model expresses the actual level of current fertility, the total fertility rate, as the outcome of the fertility reducing-effects of delaying marriage beyond puberty, marital dissolution, contraceptive use, postpartum infecundability and spousal separation on total fecundity. The latter measure represents the hypothetical fertility level in the absence of any reduction by the explicitly included variables. It reflects the effects of three secondary determinants, natural fecundability, the risk of intrauterine mortality, and the onset of permanent sterility. These vary little between large groups and the total fecundity rates for most populations fall within about two births of the average of 15.3 births per woman (Bongaarts, 1978, p.118).

Two proximate determinants - induced abortion and postpartum sexual abstinence were excluded from the model applied to the Gaza data. When the questionnaire was designed it was assumed that, as in most other Arab populations, the impact of induced abortion on the overall level of fertility in Gaza would be negligible. This assumption was not contradicted by the information gathered in the field. Discussions outside the framework of the formal interview revealed that many women are aware that Islam permits the deliberate termination of a pregnancy if it endangers the mother's health. (Of the four schools of Islamic law, the most liberal on the issue of abortion is the *Hanafi* school which allows a foetus to be aborted for either medical or general family welfare reasons at any time before it is ensouled at 120 days (Musallam, 1983, pp.57-58)). Women in the camp claimed that swimming in the sea or jumping from a high place were ways of ending an unwanted pregnancy. A woman from Khan Yunis camp stated that she had tried both methods. In ash-Shaja'iyya, two women reported having had abortions and several knew the name of a private gynaecologist who performs the operation. But, it was generally agreed that the prevalence of the practice is extremely low and that very few couples regard abortion as an acceptable method of family planning.

In societies where postpartum abstinence extends beyond the period of postpartum amenorrhoea the fertility-inhibiting effect of the former may be substantial. In Gaza, every woman who was asked about postpartum abstinence reported resuming intercourse 40 days after the birth. Moreover, when calculating the timing of an event for which the month was not known, a frequently used expression was, *hamelet dhukhri 'ala al-arba'in*, - 'I became pregnant immediately after the 40 days'. According to Granqvist (1947, p.104), a woman was considered unclean during this period and the passing of 40 days was marked by a ritual cleansing whereupon she again became available for sexual relations with her husband. The brevity of the period of abstention is confirmed by

information collected by Anderson *et al*. from 769 refugees in 1978-79: 'Ninety-three percent resumed sexual intercourse zero to one month after birth' (Anderson *et al*., 1986, p.160, note 15). Since in the absence of breast feeding the average amenorrhoea interval is 1.5 to 2 months (Leridon, 1977, cited in Bongaarts and Potter, 1983, p.25), it is safe to assume that the level of fertility in the Gaza population is unaffected by postpartum sexual abstinence.

A brief description of the five variables included in the model follows.

The indices of marriage

In populations such as Gaza, where the number of births outside marriage is negligible, the proportion of the fecund period that women spend in a marital union is a principal determinant of fertility levels. Bongaarts' index C_m measures the extent to which the total fertility rate is lower than it would be if all women were continuously married between ages 15 and 50 and experienced throughout this age range the observed age-specific marital fertility rates. The impact of marriage on fertility can be further broken down into components C_{em}, which estimates the effect of delayed entry into marriage, and C_{diss}, which measures the impact of marital dissolution (Ferry and Page, 1984, p.54). Multiplication of these two indices produces the total effect of postponement of marriage and marital breakdown on fertility.

$$C_{em} = \frac{TFR}{TEMFR} \tag{4.3}$$

$$C_{diss} = \frac{TEMFR}{TCMFR} \tag{4.4}$$

$$(C_m = C_{em} \times C_{diss})$$

where *TEMFR* is the total marital fertility rate for ever-married women;

and *TCMFR* is the total marital fertility rate for currently married women.

The index of contraception

Information on contraceptive use was obtained from the following three questions:

- If a man and his wife have enough children and they agree not to have any more, what methods do you know of for achieving this aim?
- Have you ever used any method for preventing pregnancy?
- If yes, specify.....

Questions about current contraceptive use were not asked since it was established during the pilot phase that it was impossible to conduct the individual questionnaire in privacy. This was partly due to overcrowding, but also because the interviewers were reluctant to introduce an element of secrecy by insisting on the exclusion of neighbours and other family members, at least some of who were invariably present. It was presumed that the presence of others would result in under-reporting of current use. In retrospect, this assumption was probably incorrect as discussions on the subject were extremely open. The percentage of women currently using contraceptives was therefore estimated from the percentage of women who reported ever-using contraceptives by employing the equation suggested by Sathar and Chidambaram (1984, p.12):

$$x = \frac{y - 10.06}{1.25} \qquad (4.5)$$

where x is the percentage of women currently using contraceptives;

and y is the percentage of women who have ever-used contraceptives.

Only ever-use of the IUD, oral contraceptives and female sterilization were included as the number of women who reported using condoms, or other modern and indigenous methods, who had not also used one of these methods was negligible. The value of 0.96 is taken as an approximation of the use-effectiveness of all three methods. This is the use-effectiveness rate estimated for IUD users in the Philippines (Laing, 1978 cited in Bongaarts and Potter, 1983, p.70). Very few women surveyed were sterilized (and these for health reasons, not family limitation) and most of the women who reported that they had used oral contraceptives had also used the IUD. The index of contraception, C_c, is calculated as:

$$C_c = 1 - 1.08 \times u \times e \qquad (4.6)$$

where u is the proportion of women currently using contraception (x/100 from equation 4.5);

and e is contraceptive use-effectiveness = 0.96.

The index of postpartum infecundability

The proximate determinants' model requires an estimate of the duration of the postpartum infecundable period. This is approximately equivalent to the duration of postpartum amenorrhoea. The short infecundable period (1.5 to 2 months) which follows every birth is extended if a woman breast feeds the new-born. Suckling by the infant causes the

pituitary gland to increase the production of prolactin. Prolactin, the hormone necessary for milk production and secretion, is also associated with the maintenance of the anovular state (Delvoye and Robyn, 1980 and McNeilly, 1979). Supplementation of the infant's diet with bottled milk and foodstuffs is associated with shortened durations of postpartum amenorrhoea. Reduction in the frequency and intensity of breast feeding, which accompanies the provision of nutrients from other sources, causes average prolactin levels to decline and, once they fall below a critical threshold, ovulation resumes. The quantity and type of other foods introduced, together with factors such as the continuation of night feeds, all play a role in the delay in resumption of ovulation, probably through their effect on frequency of feeding (Campbell and Gray, 1993).

Where information on the return of menstruation is not available, as is the case for the survey population, an approximate estimate of the duration of amenorrhoea can be derived from the breast feeding data. The following equation is proposed by Bongaarts and Potter (1983, p.25):

$$i = 1.753 \times \exp\{0.1396B - 0.001872B^2\} \qquad (4.7)$$

where i is the mean duration of postpartum amenorrhoea, in months;

and B is the mean duration of breast feeding (full plus partial), in months.

This equation is derived from data that do not distinguish between full and supplemented breast feeding. Its application to the Gaza data for full plus partial breast feeding probably provides the best estimate of the length of the infertile period, although the fact that full breast feeding is short - 2.55 months, suggests that the results thus obtained are likely to represent the maximum duration of lactational amenorrhoea. Equating postpartum infecundability with full breast feeding would, on the other hand, produce an unrealistically low figure for the fertility-inhibiting effect of breast feeding.

A simple method for calculating the mean duration of full plus partial breast feeding is by using the 'stationarity' or 'prevalence/incidence' mean (Ferry and Page 1984, p.51):

$$B = P/N \qquad (4.8)$$

where B is the mean duration of breast feeding (full plus partial), in months;

P is the number of women currently breast feeding (full plus partial);

and N is the number of births per month (averaged over 24 months).

Substitution of the figure derived from equation 4.8 in equation 4.7 produces the required estimate of the mean duration of amenorrhoea. Finally, equation 4.9 is used to derive C_i, the index of postpartum infecundability.

$$C_i = \frac{20}{18.5 + i} \qquad (4.9)$$

where *i* is the mean duration of amenorrhoea calculated using equation 4.7.

The index of spousal separation

Thirty husbands (2.9 per cent) of currently married women were residing elsewhere at the time of the survey. Although information on their whereabouts was not collected as part of the formal questionnaire, most of these men were noted to be working abroad, mainly in the Gulf. Two were in prison, and one was living with another wife. (A further eight husbands, present at the time of the survey, reported that their place of work was the Gulf, Libya or Jordan.) The method employed to estimate the impact of spousal separation on current fertility is that suggested by Timæus and Graham (1989, p.387). The number of women who, were it not for the absence of their husbands, would be exposed to the risk of pregnancy is calculated by deducting from the total number of women whose husbands are absent those women who are either pregnant or amenorrhoeic. The number of exposed women is used to derive an estimate of the mean duration of absence in the period of exposure (equation 4.11). In the final step (equation 4.10), C_s, the index of spousal separation, is calculated. This equation is a modification of Ferry and Page's formula for the index of postpartum sexual abstinence (Ferry and Page, 1984, p.54):

$$C_s = \frac{18.5 + i}{18.5 + i + H} \qquad (4.10)$$

where *i* is the mean duration of amenorrhoea calculated using equation 4.7.

and *H* is the mean duration of husband's absence during the period of exposure, in months:

$$H = P(h)/N \qquad (4.11)$$

where *P(h)* is the number of women whose husbands are absent who are not pregnant nor in the postpartum infecundable state;

and *N* is the number of births per month (averaged over 24 months).

The results derived using this method represent the minimum impact of spousal separation on fertility. In particular, no attempt has been made to estimate the effect on fertility of short absences - husbands working and sleeping in Israel who return to Gaza once a week or once a fortnight.

4.2.2 Mortality

Direct and indirect methods

The direct method for estimating child mortality using data collected in maternity histories is described in Somoza (1980). The numerator is the number of deaths and the denominator the number of live births or living children. Using the reported ages at deaths and life table procedures, mortality measures for selected age intervals can be calculated for different periods of time preceding the survey. The principal advantage of the direct method is that the rates are not limited to single years but can cover intervals of weeks or months, depending only on the detail of the information collected. Equally important is the fact that no assumptions are made about the pattern of mortality. However, inaccurate reporting of the age at death can cause considerable distortions in the rates. Thus, for example, under-reporting of deaths at ages 10 and 11 months and heaping on exact age one year produces an underestimate of infant mortality and an overestimate of the mortality rate in the next age group. Likewise, misdating of births and deaths can result in the rates for adjacent periods being under- or overstated. Also, although the direct method can permit the calculation of mortality rates for a more extensive time-span than that covered by the indirect method, estimates for the past will be biased. This is because the Gaza survey only collected birth histories from women aged 15-50 at the time of the survey. Thus, the rates for periods further in the past will over-represent the mortality experience of the children of young mothers. Moreover, since the rates for the distant past are based on a greatly reduced sample of births, they are subject to greater sampling errors than those for recent births.

The indirect technique for estimating child mortality converts proportions dead among children ever-born to women in the seven conventional age groups into probabilities of dying by certain exact ages. Again, Brass pioneered the development of the method (Brass 1964). Of all the subsequent modifications, Coale and Trussell's procedure for determining the time periods to which the estimates apply has proved particularly useful (Coale and Trussell, 1977). All variants of the technique incorporate models of both fertility and mortality. Hence the principal disadvantage of the indirect method, - the age pattern of death in the study population is assumed to be the same as that of the chosen model population. Unless accurate information on the age pattern of mortality is available from other sources (unlikely), it is precisely this distribution of deaths at early ages, together with levels and trends, which is the subject of investigation. Changes in the age

pattern of mortality over time may present an additional problem. Furthermore, distortions may be introduced by inaccurate reporting of women's ages. However, the advantages of the indirect method are several. Most importantly, the dating of births and deaths is not required and thus the estimates are not affected by either reference period errors or heaping on particular ages at deaths. Also, computation of the rates is extremely simple.

Mortality rates estimated by both direct and indirect methods may be affected by the omission of births and deaths. When completing the maternity histories mothers are requested to recall the chronology of all vital events, including miscarriages and stillbirths, commencing from the time of their first marriage. This, together with the careful probing of abnormally long pregnancy intervals by thorough interviewers, will usually result in a more complete recording of events than just asking about the number of living and dead sons and daughters in a household questionnaire. Comparison of the results from the two methods, permits the identification of the more reliable features from each. It should provide the most accurate indication of mortality levels and trends.

An integral component of the mortality investigation is the examination of the age pattern of deaths at young ages. By comparing the age pattern with both the patterns exhibited by populations with accurate mortality data and with reported causes of death for other populations in the area, a general impression of the leading causes of death can be inferred.

Multivariate analysis - hazards model

Multivariate analysis provides a tool for assessing the association between several co-variates and mortality. For this study, log-linear rate models, also known as Poisson regression, are employed. Descriptions of this model, its underlying assumptions and its application to World Fertility Survey birth history data are given in both Trussell and Hammerslough (1983) and Martin *et al*. (1983). Such hazards models are essentially life tables with co-variates.[13] The hazard rate is an individual's likelihood of dying during a given age interval, provided that the individual survived to the beginning of that age interval. Maximum likelihood procedures are used to derive parameter estimates and their standard errors.

[13] Log-linear rates models have two principal advantages over other regression models. First, variations with age in the impact of the co-variates can be examined, and secondly, censored data do not have to be discarded as is the case with some other regression models.

A model in which three co-variates, age at death, mother's education, and husband's education are included is expressed as:

$$\ln(\hat{D}_{amh}) = \ln(N_{amh}) + c + \alpha_a + \beta_m + \delta_h \qquad (4.12)$$

where: $\hat{D}_{amh}$ is the expected number of deaths among children in the *a*th interval in mother's education group *m*, and husband's education group *h*;

N_{amh} is the number of person-months exposure in the *a*th interval of children in mothers' education group *m* and husbands' education group *h*;

c is a constant term - the 'grand mean'. It is the risk of dying for individuals in the baseline group of each of the three co-variates;

and α_a is the parameter estimate for an individual in age interval *a*, the exponentiation of which is interpreted as the relative risk associated with an individual in the *a*th interval relative to an individual in the baseline category. β_m and δ_h are analogously defined.

Rearrangement of equation (4.12) gives:

$$\frac{\hat{D}_{amh}}{N_{amh}} = e^{c} \cdot e^{(\alpha_a + \beta_m + \delta_h)} \qquad (4.13)$$

The terms on the right-hand side of equation 4.13 are the parameters whose values are to be estimated.

The computer package GLIM which fits generalized linear models was used for the analysis (Payne, 1987). The aim is to find the simplest model which adequately describes the data. GLIM provides a measure of 'goodness of fit', - the deviance. The statistical significance of each variable is measured by comparing the change in the deviance between a model which does, and one which does not include the specified variable with a chi-squared distribution. If the improvement in fit is not significant at the 5 per cent level or less, the more restrictive model with fewer variables is chosen.

4.3 Data quality

Demographic measures derived from retrospective surveys may be biased by errors in the data. However, systematic scrutiny of the data for internal consistency and plausible results, together with a comparison of the findings with those from other sources, can indicate the quality of the data and their limitations. A summary of the most important findings is presented in this section together with an indication of where each feature is examined in detail. The extent to which reporting errors affect the demographic estimates is addressed in the chapters on levels and trends in fertility (Chapter 7) and mortality (Chapter 8).

4.3.1 Age reporting

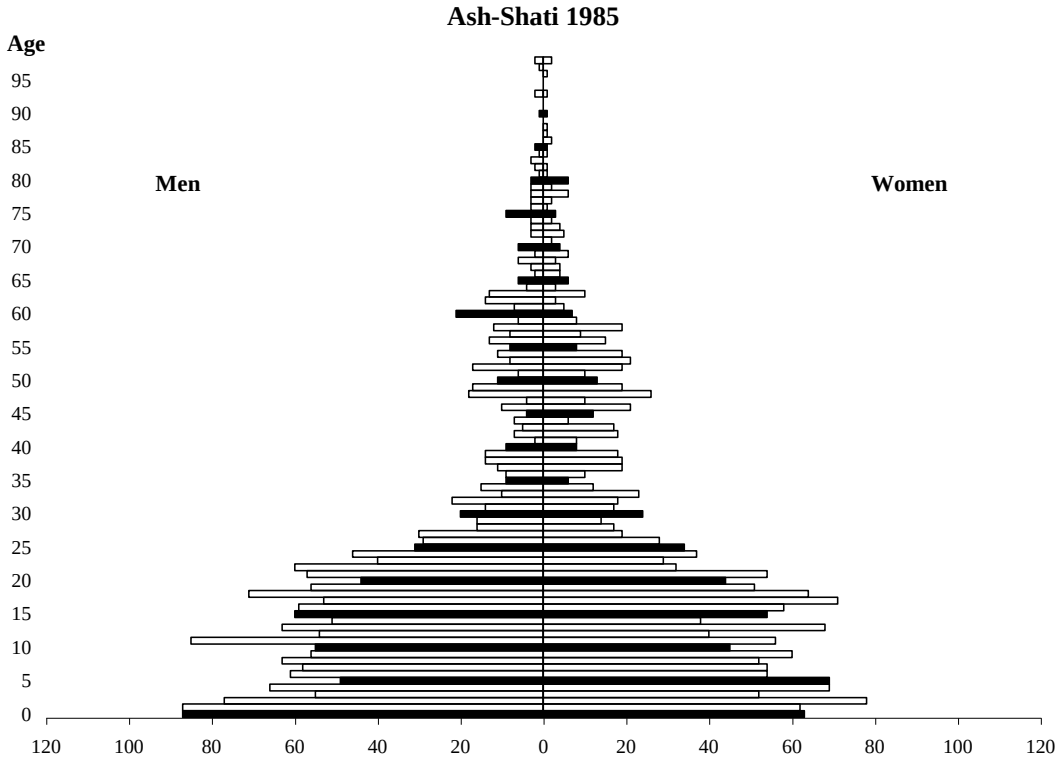
Digital preference

The single-year age distributions for the ash-Shati and ash-Shaja'iyya populations are plausible; there is no evidence of preference for ages ending in particular digits, for example zero or five (see Figure 4.1 and Figure 4.2).

Age transference

A second form of age misstatement is a systematic tendency for age to be under- or overstated. Age transference is potentially of greater consequence for the accurate calculation of demographic rates especially if, for example, it is associated with marital status or fertility. In closed, stable or quasi-stable populations, the systematic exaggeration or understatement of age can be easily identified by examining the population distribution by five-year age groups together with the corresponding sex ratios. In populations, which are affected by migration, the identification of errors in reported ages is more difficult. In Section 5.2 an attempt is made to establish those features of the ash-Shati and ash-Shaja'iyya population structures which arise from age and sex-selective out-migration. Even after accounting for the differential impact of emigration, evidence exists that the enumerated populations are affected by age transference. The accuracy of the demographic measures is undermined by three cases of age misstatement. These are:

- In ash-Shati there are too few women aged 20-24 and too many aged 15-19.
- Also, in the refugee camp, the ages of some of the women actually aged 40-44 are probably exaggerated. However, the number of women involved is small and certainly not large enough to reverse the relative sizes of the two age groups. (The



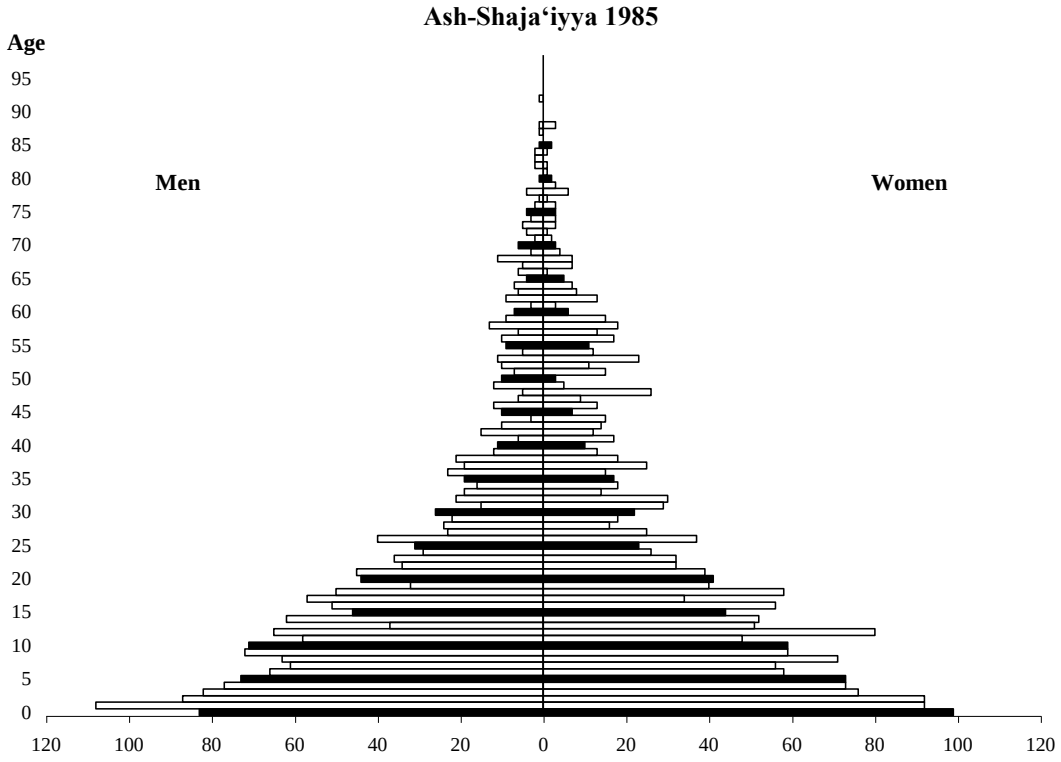


Figure 4.1 Age-sex distribution of the *de jure* 1985 survey populations of ash-Shati and ash-Shaja‘iyya

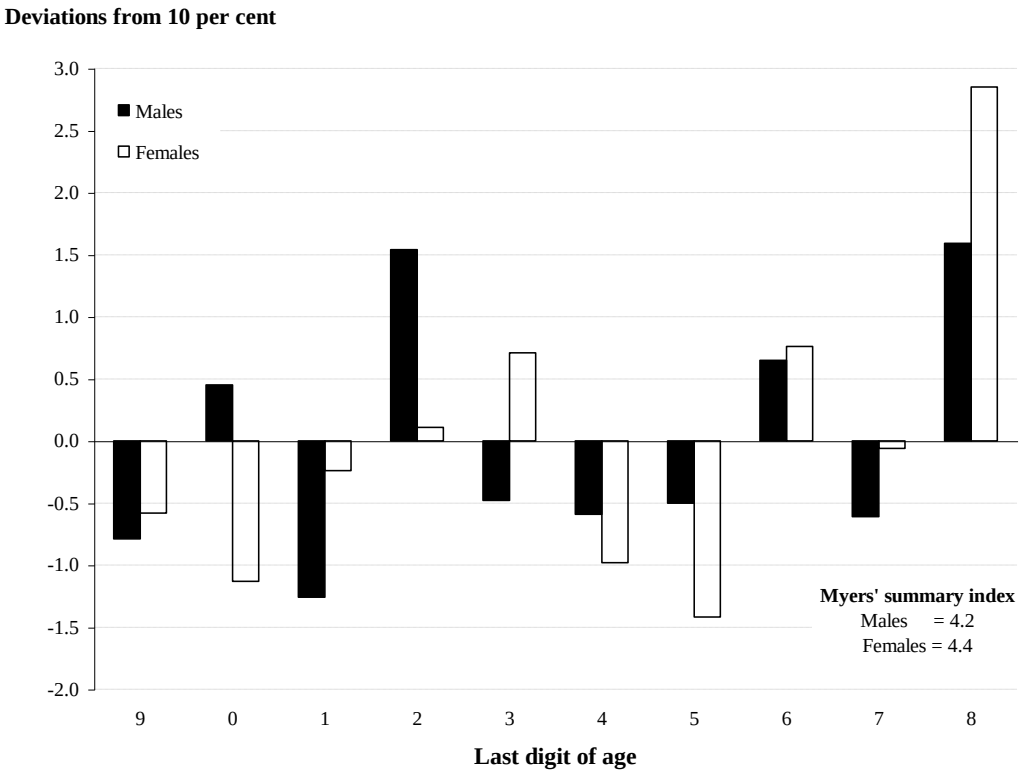


Figure 4.2 Preference for digits in the reporting of age in the household survey measured by deviations from 10 per cent in the calculation of Myers' Index, ages 10-89, by sex

large number of women aged 45-49 compared with the number aged 40-44 is believed to be a genuine finding - see Section 5.2.)

- In ash-Shajaʻiyya the 25-29 cohort is relatively small in comparison with the adjacent five-year age groups. The evidence indicates that the ages of some women in the latter group who have experienced higher than average fertility are recorded as 30 or 31.

4.3.2 Vital event reporting

Maternity history results

Birth histories are often subject to event displacement and omission of vital events (Potter, 1977; Goldman *et al*., 1979 and Balkaran, 1982). Investigation shows that, in general, the data recorded in the maternity histories are internally consistent and, compared with similar data from other Middle Eastern countries, the coverage and dating of events is good. However, there is some evidence of errors in the recording of both births and deaths.

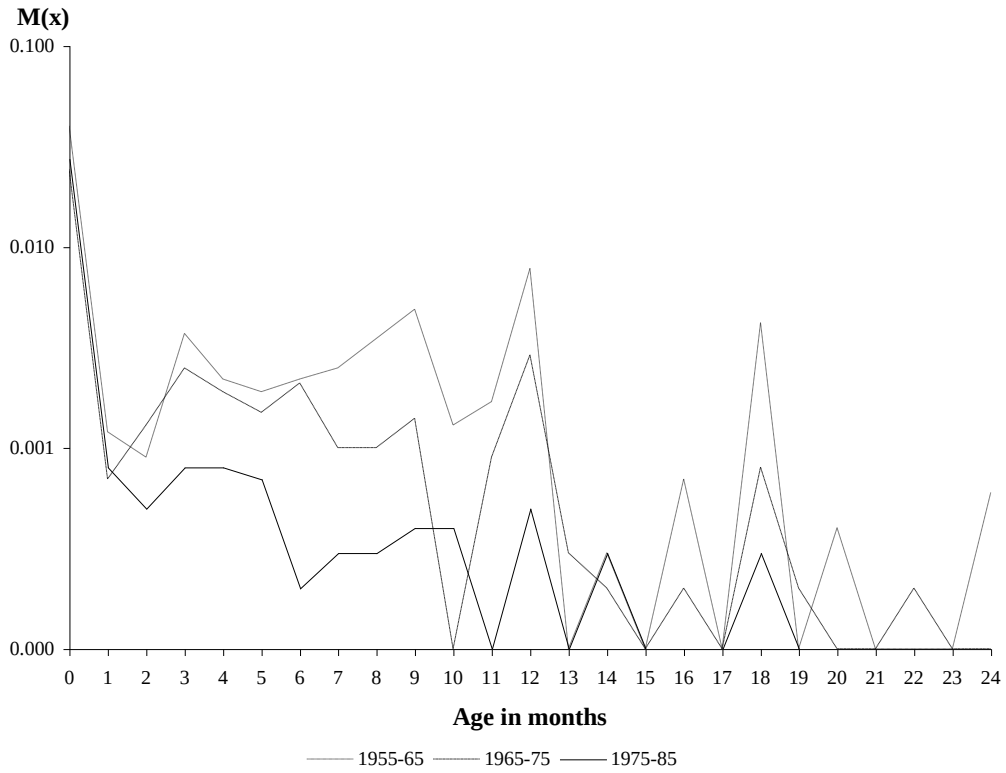


Figure 4.3 Reported age-specific death rates (M_x), total population, by period

Omission of events

- The evidence suggests that women aged 45-49 in ash-Shajaʻiyya failed to report some child deaths (Section 8.1).
- Figure 4.3 shows the estimated age-specific death rates for the periods 0-9, 10-19 and 20-29 years before the survey. The rates are calculated from the live births and deaths reported in the maternity histories. Compared with the level of mortality in the first month of life in the years 1975-85, the estimated neonatal mortality rate in 1965-75 is implausibly low. The same is true for the earlier period, though to a lesser extent. The most likely explanation for the anomaly is that neither the birth nor death of some infants who died at a very young age were recorded. These omissions are discussed further in the examination of sex differentials in mortality by five-year periods (Section 8.3).

Displacement of events

- The sex ratios at birth for the periods 5-9 and 10-14 years prior to the survey are 1.01 and 1.15 (Table 4.2). The sex ratios for the enumerated 5-9 and 10-14 age groups in ash-Shati are 0.99 and 1.25. Clearly both the dates of birth and the ages of some young boys in the refugee camp were incorrectly recorded. It is important to

Table 4.2 Sex ratios at birth by current age of mothers and period before the survey (number of births in parentheses)

Current age	Years before survey						
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25+ (Pre-1960)	All
15-19	90 (95)						90 (95)
20-24	97 (424)	104 (55)					98 (479)
25-29	104 (390)	83* (267)	210* (31)	0 (1)			98 (689)
30-34	115 (377)	116 (398)	116 (248)	158* (31)			117* (1054)
35-39	99 (207)	94 (266)	104 (286)	100 (170)	137 (45)	0 (1)	101 (975)
40-44	118 (104)	106 (171)	121* (239)	108 (245)	104 (214)	124 (65)	111 (1008)
45-49	121 (74)	110 (132)	113 (243)	101 (302)	114 (283)	102 (257)	108 (1248)
All	104 (1598)	101 (1289)	115* (1047)	105 (749)	112 (542)	107 (323)	106 (5548)

* 95 per cent confidence limits exclude 106.

emphasise, however, that, with this notable exception, the dating of births appears rather accurate.

- A second type of event displacement is heaping of the reported ages at death. Figure 4.3 shows the result of heaping of deaths on ages 12 and 18 months at the expense of adjacent months. As would be expected, the heaping becomes more pronounced for children born long before their mothers were interviewed. As a result of the shortage of deaths at ages 10 and 11 months and the excess of deaths at exactly one year, estimates of infant mortality in the periods 1955-65 and 1965-75 will be too low but mortality at ages 1-4 years will be over-estimated. The peaks and troughs in the monthly number of infant deaths for the two earliest periods also suggest some rounding of ages at death to 3, 6 or 9 months. In contrast, the curve of the distribution of infant deaths for children born in 1975-85 shows an almost uninterrupted progressive reduction in the number of deaths with increasing age. This is the expected pattern and the result is encouraging. The reported ages at death for children born in the period mid-1982 to mid-1985 (Figure 4.4) also reveal a plausible pattern.

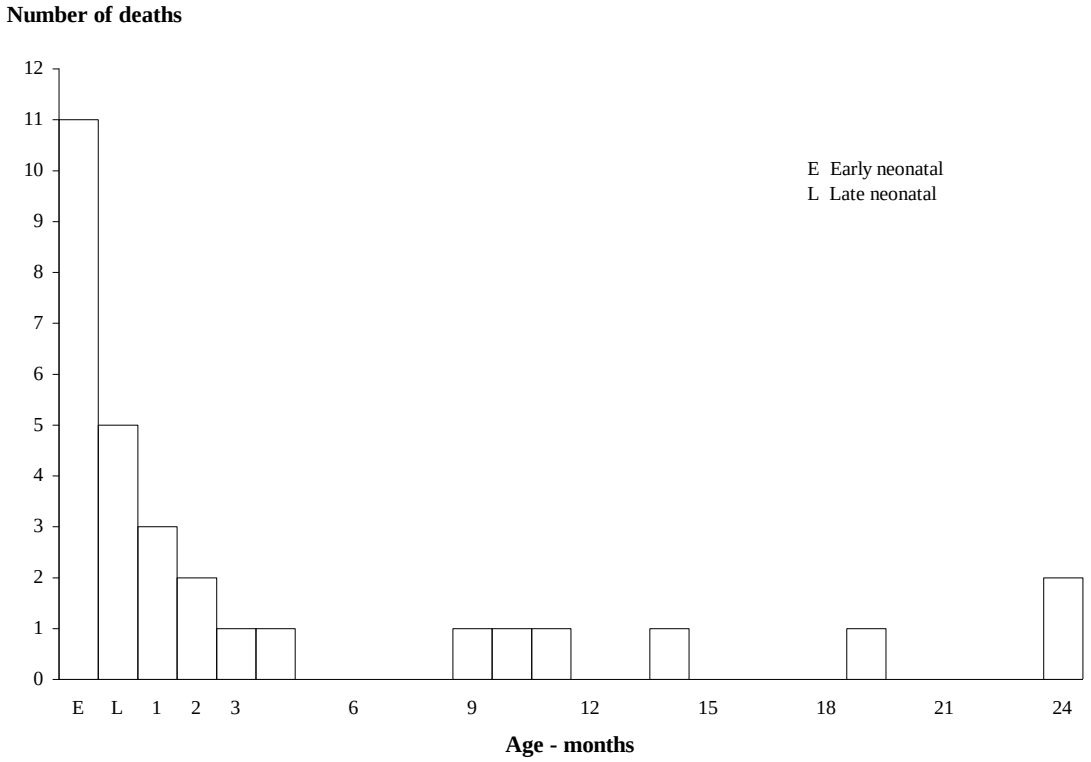


Figure 4.4 Reported ages at death of children born within three years of the survey (1982-85)

It follows that estimates derived from the birth history data of recent levels of child mortality are likely to be accurate.

Comparison of household questionnaire and maternity history results

The enquiry was designed to allow the estimation of lifetime fertility from both summary questions on the household schedule and the detailed maternity histories. The total number of children ever-born reported in the household questionnaires and the number of live births recorded in the birth histories are compared in Table 4.3. The household schedule fertility questions recorded 472 (8.5 per cent) fewer births than the more detailed individual questionnaires. Other retrospective surveys which have included both sets of questions have sometimes noted an underenumeration of births when summary questions are used (see, for example, Abdel-Aziz, 1983). This is usually attributed to inaccurate proxy reporting or to the omission of children living away from home and/or children born in the distant past who have since died. The figures in the third column of Table 4.3 reveal that the proportion of births omitted increases steadily from the 20-24 group to the 40-44 group. Even for women in their twenties and early thirties, the groups for whom the *level* of fertility is usually the most accurately recorded, there is some underenumeration of births. In contrast to the reporting on live births, the difference in total deaths recorded

Table 4.3 Comparison of births and deaths recorded in the household questionnaires and maternity histories, by age group of mother

Age group	Births			Deaths		
	Children ever-born HHQ (a)	Live births MH (b)	(a) / (b)	Dead children HHQ (c)	Live births since died MH (d)	(c) / (d)
15-19	96	95	1.01	2	2	1.00
20-24	469	479	0.98	15	15	1.00
25-29	663	689	0.96	35	37	0.95
30-34	992	1054	0.94	79	78	1.01
35-39	883	975	0.91	99	98	1.01
40-44	869	1008	0.86	155	157	0.99
45-49	1104	1248	0.88	175	170	1.03
Total	5076	5548	0.91	560	557	1.01

Sources: HHQ – household questionnaires; MH - maternity histories.

is only three (0.5 per cent) and the consistency by age group is extremely good. The two causes of error cited above are therefore rejected as explanations for the anomalies in the Gaza data. The quality of the Gaza maternity history data is good; it seems that the problem is rooted in the question used to derive the number of children ever-born in the household questionnaire.

The heading of the relevant columns on the household schedule are *'adad al-aulad al-ahya* - number of children alive/living. (There was a separate column for each sex.) During the training of the interviewers it was explained that this was an abbreviation for the number of children *born alive*. If the missing births (and their distribution by age group) had approximated the number of deaths, it would be clear that the question was universally misunderstood to refer to *children alive at the time of the survey*. However, this was not the case as there are 472 missing births and 560 deaths. Examination of the numbers reported on the two schedules for ash-Shati and ash-Shaja'iyya separately (not shown) reveals the same scale of omissions. Thus, interpretation of the question did not change as the survey progressed. A simple calculation was therefore carried out to establish whether this ambiguity in the household schedule is the source of the error. For each woman, the total children 'born alive' was calculated from both the household and the individual questionnaires. For each case in which there was not an exact match (299 cases), the number of dead children from the household schedule was added to the number 'born alive' reported on the same questionnaire. These figures were then cross-tabulated with the total live births derived from the maternity histories. In 267 (89 per cent) of these cases the new totals agreed, indicating that the source of the error had been

correctly identified. Further investigation by sex and parity did not contradict this finding. It is therefore concluded that, when completing the questions about children ever-born on the household schedule, only one or two of the interviewers recorded the correct information, that is the number of children *born alive*. Most of the other interviewers consistently, but incorrectly, entered the number of *living males and females* in the two birth columns. Regrettably, this important error was not detected during the daily checking of the questionnaires.

4.3.3 Other limitations of the data

The main deficiency in the design of the survey relates to date of marriage. This information would have been desirable but the question was not included in the questionnaire. Other data were collected but not analysed. They include information on income, which was poorly recorded, and data on kinship relationships between husbands and wives, which were collected using an open-ended question and proved difficult to code.

CHAPTER 5

THE POPULATIONS OF ASH-SHATI AND ASH-SHAJA'IYYA

The first three chapters of this thesis describe political, socio-economic and demographic changes in pre-1948 Palestine and summarise the developments in the different Palestinian communities after the country was partitioned. This chapter focuses on the Gaza Strip and the populations of ash-Shati and ash-Shaja'iyya in particular. Section 5.1 presents information on the origins of individuals who were interviewed in the Gaza survey. It also provides summary descriptions of socio-economic conditions in the Gaza Strip during British, Egyptian and then Israeli rule. This is followed in Section 5.2 by an examination of the age-sex distributions of the ash-Shati and ash-Shaja'iyya populations. The final section of the chapter, Section 5.3, describes household resources and amenities in 1985 and considers changes that influenced the uptake of schooling for girls in the two communities.

5.1 Background

5.1.1 Pre-1948

The Gaza Strip is a tiny territory located in the south-eastern corner of the Mediterranean. It is approximately 45 kilometres long and between six and twelve kilometres wide. Sand dunes cover about 30 per cent of the total surface area of 364 square kilometres. During the British Mandate most of this littoral, plus an additional 700 square kilometres to the north and north-east fell within the administrative Sub-district of Gaza. Two features of population change in this area during British rule are remarked upon in the 1946 *Survey of Palestine*. These are the substantial increase in the rural population in the Gaza Sub-district (and in other coastal areas) and the rapid growth of Gaza town in the years 1931-1944 (Palestine Government, 1946, Vol. I, pp.157-158). According to official estimates, the residents of Gaza town numbered 17,426 in 1922, 17,045 in 1931 and 34,170 at the end of 1944 (Palestine, DS, 1947). The 1931-44 increase of 3.5 per cent per year compares with an average annual growth rate for all Palestinian towns of 3.1 per cent

Table 5.1 Ash-Shati population, by place of origin, settlement size in 1931, and reason for leaving settlement in 1948

Place of origin	Percentage of surveyed population, 1985	Percentage of families in 1982[a]	Population in 1931[b]	Reason fled in 1948[c]
Gaza Sub-District				
Barbara	3.3	3.9	1546	M
Barqa	0.5	0.6	600	M
Bayt Daras	1.4	1.4	1804	M
Bayt Jirja	0.4	2.4	619	NK
Burayr	1.6	1.5	1894	M
Dayr Sunayd	2.0	0.8	475	NK
Al-Faluja	0.8	0.9	3161	E
Gaza Strip	1.0	-		
Hamama	18.1	17.4	3405	M
Hiribya	7.8	7.4	1520	M
Isdud	4.3	5.0	3140	M
Al-Jiyya	2.5	-	889	M
Al-Jura	10.7	8.0	682	M
Karatiyya	0.3	2.0	932	M
Al-Majdal	7.0	10.1	6398	M
Ni'ilya	1.2	1.9	863	M
Al-Sawafir[d]	1.7	2.4	1964	F
17 other villages	1.8	4.5		
6 other villages	-	1.8		
Beersheba Sub-District				
Beersheba	1.1	1.3	2959	M/E
Ramleh Sub-District				
Al-Qubayba	0.9	1.0	799	E
Bashshit	0.7	0.7	1125	M
Ramleh	0.6	0.9	10347	E/M
Yibna	5.5	3.3	3600	M/E
Zarnuqa	1.8	1.3	1952	E
Jaffa Sub-District				
Jaffa + suburbs	21.0	15.0	55346	M
3 other towns	0.5	1.3		
7 other villages	1.3	1.7		
5 other villages	-	1.5		
Egypt	0.3	-		
TOTAL	100.0	100.0		

Sources and notes:

(a) Al-Madani (1987), p. 27. The figures are from UNRWA. In January 1982, 4523 families were registered in ash-Shati camp. The place of origin of 674 families is not stated. The percentages are for the 3849 families whose origin is known.

(b) Mills (1932). Al-Majdal, Beersheba, Ramleh and Jaffa were classified as towns in 1931.

(c) Morris (1987), tables pp. xiv-xviii and text:

M: Military assault on the settlement by Jewish troops;
NK: Not known;
F: Fear of Jewish attack or of being caught up in the fighting;
E: Expulsion by Jewish forces;

Some of the Palestinian population of al-Majdal left in 1948, others in 1951. Residents of al-Faluja who did not flee in 1948 were driven out in 1949.

(d) Three villages, al-Sawafir al-Gharbiyya, al-Sawafir al-Sharqiyya and al-Sawafir al-Shamaliyya.
Two villages, al-Masmiyya al-Kabira and al-Masmiyya al-Saghira.

Table 5.2 Ash-Shaja'iyya population, by place of origin, settlement size in 1931, and reason for leaving settlement in 1948

Place of origin	Percentage of surveyed population, 1985	Population in 1931[b]	Reason fled in 1948[e]
Gaza Sub-District			
Gaza Strip	80.1		
Kaufakha	1.7	317	M
Al-Majdal	1.3	6398	M
Al-Masmiyya[e]	1.5	2110	M
Al-Muharraqa	1.3	422	M
14 other villages	4.2		
Beersheba Sub-District			
Beersheba	5.2	2959	M/E
Jaffa Sub-District			
Jaffa + suburbs	2.3	55346	M
4 other towns	0.3		
8 other villages	1.8		
Egypt	0.2		
TOTAL	99.9		

Sources and notes: See Table 5.1.

over the same period. Migration, from the hills to the plain and from villages to the 'urban' settlements of al-Majdal and Khan Yunis, as well as Gaza town, explain the particularly high growth rates in the Gaza Sub-district. Immigration from other Arab countries may also have made a small contribution to the increase.

The information which is summarised in Table 5.1 shows that almost two-thirds of the surveyed population in the ash-Shati refugee camp trace their origins to villages in the Gaza Sub-district. A further 7 per cent come from the town of al-Majdal (now Ashkelon). Of the remainder, Jaffa residents comprise the largest group - 21 per cent of the total, and 4 per cent of the refugees are from villages in the Ramleh Sub-district. Twenty per cent of the population of ash-Shaja'iyya hail from places outside the Gaza Strip. Approximately half of the incomers in ash-Shaja'iyya are from al-Majdal and villages in the Gaza Sub-district and one quarter are from the town of Beersheba (Table 5.2). Although no attempt was made to establish when the non-indigenous population of ash-Shaja'iyya took up residence in the quarter, it is reasonable to assume that the large majority of persons from Jaffa, al-Majdal, Beersheba and the villages indicated in Table 5.2 arrived as refugees in 1948. However, some of the incomers may have arrived from other areas of Palestine in the 1930s and early 1940s and a few families may have relocated from other parts of the Gaza Strip after 1948.

In 1931, 62 per cent of Arabs in Palestine but 73 per cent of the inhabitants of the Gaza Sub-district were supported by earners who derived their livelihood from agriculture (Mills, 1933b). The crops varied with the type of soil and water availability. On the coastal plain wheat, barley, *dhurra* (a variety of sorghum), sesame, beans, lentils, vegetables, olives and citrus fruit were cultivated on clay soils, vines and fig, pomegranate, apricot, plum and apple trees flourished on land with a high sand content (Kanana and al-Madani, 1986, p.104). Not only village dwellers but also many families in Gaza town and al-Majdal owned cultivable land or worked the land of others. Much of the agricultural produce was consumed by the cultivators but surplus was sold in the markets in the towns and large villages.

Industry in the area was poorly developed and supported only 9 per cent of the population. Most 'industrial establishments' were very small workshops with few workers other than family members. They supplied local demand for wood and metal products and processed foodstuffs, particularly flour. Only the textile industry had a country-wide reputation. Skilled weavers operating treadle looms produced clothing materials ranging from basic cotton to luxury dress fabrics of linen or cotton with silk warp stripes. According to Weir (1989, p.28), there were 50 looms in Gaza before the First World war and ten times that number in al-Majdal in 1909. The 1928 *Census of Industries* reveals that, of the 127 weaving establishments in Palestine, 118 were located in the Gaza Sub-district. The Gaza establishments accounted for 70 per cent of the reported value of the country's cloth output and employed 412 workers one third of whom were owners or their relatives (Palestine, DCET, 1929, p.88). The 1931 Census identified 609 male and 21 female textile production workers (Mills, 1933b). However, it is clear from Kanana and al-Madani's (1986) description of the industry in al-Majdal that, as in the case of subsistence farming, official statistics underestimate the contribution made by women to the various stages of cloth manufacture. One final point merits a mention. The fortunes of the weaving industry waxed and waned - largely in response to competition from cheaper imports. It prospered during the Second World War. This was the impetus for the 1940s' purchase of an electricity generator to run the first power-driven looms in Gaza town (Sa'id Filfil, personal communication).

Trade played a vital role in Palestinian economic life; Gaza town was the Southern link in the chain. In 1931 the number of earners in the Gaza Sub-district classified as traders and transport workers equalled the total employed in industry. It was the subsequent expansion of this sector of the economy which is largely responsible for the

rapid and substantial increase in Gaza town's population in the second part of the Mandatory period:

> By 1947 Gaza was a rather prosperous market town functioning as a collecting and forwarding center for the citrus, wheat, barley, and durra crops of the Gaza and Beersheba districts. About one fifth of the whole Palestinian citrus crop and 150,000 tons of cereals were annually collected here and sent north, partly for export from Jaffa... [c]ommunications with the outside world were good. Both a tarmac road and the standard-gauge railway line from Egypt to Haifa and Beirut ran through Gaza. There was no port worth the name, but 40 or 50 small sailing vessels might be expected to call at Gaza during the late summer when the winds were safe. (Baster, 1955, p.323)

5.1.2 'The Disaster' and Egyptian rule, 1948-1967

On November 29th, 1947 the United Nations General Assembly voted to partition Palestine into two states, one Arab and one Jewish. The Zionists welcomed the decision, the Palestinians and other Arabs rejected it. Shortly afterwards the British announced that they would complete their withdrawal from the country by May 15th, 1948.

A detailed account of the uprooting and dispossession of the Palestinians is beyond the scope of this work. Instead, *an-Nakba* – 'The Disaster' - is summarised by a brief indication of when and why the inhabitants of those towns and villages which are represented in the surveyed population abandoned their homes. A single source of information is used. This is the work of Benny Morris, an Israeli researcher who had access to a wide range of military and other Zionist archives (Morris, 1987). The initials in the final columns of Tables 5.1 and 5.2 show that, according to Morris' classification, the overwhelming majority fled because of 'Military assault on the settlement by Jewish troops'. 'Expulsion by Jewish forces' rendered most of the others homeless.

The refugees fled south seeking the protection of the Egyptian army. Some early arrivees were taken in by the indigenous Gazan community or accommodated in mosques, schools or abandoned British army camps, but the majority were forced to live in the open, on the beach, in citrus orchards, or wherever they could find a modicum of shelter.

> The upshot of the October-November [1948] battles in the south was that the Gaza Strip's refugee population had jumped from the pre-Operation Yoav figure of 100,000 to "230,000", according to an official of the United Nations Refugee Relief Project, F.G. Beard. Beard reported that the conditions of these refugees "def[ies] description...Almost all of them are living in the open...[and are] receiving no regular rations of food...there are no sanitary facilities... and conditions of horrifying filth exist." (Morris, 1987, p.224; the date on the document in which Beard's comments are cited is November 16, 1948.)

Although many families were split up during the exodus, on arrival in Gaza most sought out and camped with their fellow villagers. After spending the limited amounts of cash which they brought with them, the majority of the refugees became totally dependent on handouts for their physical survival. Egyptian relief efforts were administered first by the army and subsequently by the Egyptian Red Cross. The Egyptians depended on the *Mukhatir* (village leaders) to maintain control and to assist in estimating the number of individuals eligible for rations (Cheal, 1985). The American Friends Service Committee (AFSC - Quakers), who took over responsibility for operationalising United Nations relief efforts in the Strip in December 1948, followed the Egyptian example;

> Grouping villages together in camps was done not only for the administrative convenience on the part of the Quakers; it was done also to re-establish and maintain the social organization of the village. Every attempt was made to find the leaders of each group who were then responsible for giving the traditional leadership of the village. In setting up the tent camps and assigning sections to particular villages the fundamental principle under which the Quakers worked was to keep villages together. (Cheal, 1985, p.48).

The effect of billeting the refugees in this way can be detected in the composition of ash-Shati's population in the 1980s. It helps to explain the variation in the representation of pre-1948 settlements between UNRWA's figures for 3849 families in 1982 and the 1985 surveyed population (see Table 5.1). In the sampled clusters there are fewer persons from al-Majdal and Bait Jirja, for example, but a greater number from Dayr Sunaid and Jaffa than would be expected on the basis of the 1982 data.

The camp populations, whether of rural or urban origin, agriculturalists or artisans, shared the common fate of being homeless and deprived of their means of livelihood. The conditions which they experienced in exile reinforced the traditional familial and village ties which were seen as one of the few elements of continuity and identity in a time of almost total social disintegration and massive insecurity (Smith, 1984, p.155).

Relief efforts concentrated on the provision of food, shelter, (blankets and tents) and limited medical assistance. However, concerned about the plight of 65,000 children of school age, the Quakers opened 'schools' for 16,000 boys and girls in March 1949 (Cheal, 1985). The tented classes were taught by volunteer teachers who had lost their jobs in Palestine. Given the deplorable physical conditions of the camps, and the absence of alternative ways of occupying the young, families were happy to allow children of both sexes to attend. The provision of a glass of milk a day and, later, hot meals for those children from families in particular need, was probably an additional incentive. Before they left in 1950 the Quakers also opened classes in weaving, carpentry, sewing, and

embroidery and started a basic teacher training programme. However, as it was assumed that the refugees would be settling in another location, no major income-generating projects were initiated. Since May 1950, when the United Nations Relief and Works Agency (UNRWA) took over responsibility, there has been no radical change in the type of services provided for the refugees.

The borders of the Gaza Strip were established in the Israeli-Egyptian Armistice Agreement of 1949. There were eleven centres of habitation in this area - the towns of Gaza and Khan Yunis and nine villages. At the end of 1944, the last year for which the Palestine Government published population estimates at the village level, the settled population in these communities totalled 64,840 (calculated from Hadawi, 1970, pp.45-46). Four years later the indigenous population of the Gaza Strip, the *Muwatinin*, probably numbered between 70,000 and 78,000 and they were hosts to up to 230,000 Palestinians from other parts of the country. All sides acknowledge that, as a consequence of duplicate or fraudulent registrations and underreporting of deaths, the early estimates were exaggerated. (The extent of the over-count remains a subject of contention.) But the problem is compounded by the fact that in the period immediately after *an-Nakba*, ration cards were issued to families who lost their means of livelihood but not their homes as well as to those who were deprived of both. In 1950, UNRWA decided that only the latter group were entitled to relief. Large numbers of persons who lost their means of subsistence but were not displaced - so-called economic refugees - were removed from the agency's register (UNRWA, 1983, pp.63-68). However, during the fieldwork in 1985 several indigenous ash-Shaja'iyya households volunteered the information that they remained on UNRWA's list of eligible refugees.

There is no way of knowing how many *Muwatinin* are included in UNRWA's figures for the refugee population in the Gaza Strip. What cannot be disputed is the devastation of the economy of Gaza town and the rest of the Strip which resulted from the combined effect of Partition and the influx of thousands of refugees. The town was cut off from its agricultural hinterland and all but the southern trade routes were severed. Moreover, roughly one third of the land owned by residents of the town was lost to the Jewish state. Families in ash-Shaja'iyya, the most easterly quarter of Gaza, were among those affected by this particular outcome of events. Even the electricity supply to the Gaza Municipality was cut off (during the Mandate the source of power was a company in Tel Aviv). The generator which had been intended to support an expanding weaving industry was diverted to public use (Sa'id Filfil, personal communication). Not only was there intense

competition for the few jobs which were available, but wages were severely depressed because UNRWA permitted refugees to supplement their subsistence rations with modest earnings. According to James Baster, an economic advisor employed by UNRWA:

> The people at the bottom of the income pyramid - in real danger of starvation - are at present not the refugees at all but indigenous workers who receive only the going wage and cannot qualify for UN rations. These people are the responsibility of the Egyptian military authorities, who from time to time have operated their own system of flour distribution at low prices. (Baster, 1955, p.326.)

By the early 1950s, skilled wages had fallen to 30 Egyptian piastres a day and pay for unskilled workers was 10-12 piastres. Several years earlier the daily rate of pay for the same groups were 100 and 30 piastres respectively (Baster, 1955, p.325).

Details of economic developments in the Gaza Strip during Egyptian rule are documented in Khulusi (1967), Van Arkadie (1977), Gharaibeh (1985) and Abu-Amr (1988). In fact, the conditions experienced by the majority of the population throughout this period can be summarised by a single economic indicator. This is the level of unemployment. In 1960 an estimated 61 per cent of the Gaza labour force was unemployed. The figures for refugees and *Muwatinin* are 85 and 35 per cent respectively (Khulusi, 1967, pp.61-64). Figures from the 1967 census show that at least 28 per cent of the male population aged 15-64 (*who were still in the country at the time of the census*) were unemployed on the eve of the 1967 war (calculated from Israel, CBS, 1968a and 1968c).

Partition and exile sharpened the Palestinians' awareness of the social and economic mobility attainable through education and training (Yusuf, 1979 and Graham-Brown, 1984a). Educated refugees fared better than their illiterate counterparts. UNRWA teachers, administrative and clerical staff were relatively well-paid, doctors earned 50 Egyptian pounds per month. Increasingly, refugees entered government secondary schools after completing the UNRWA cycle. During the Egyptian occupation the cost to families of keeping a son in school in terms of labour lost was limited because of the high level of unemployment. Often, however, it was only when one or two sons were already working that their parents could afford to leave a younger son in school. All concerned hoped that this would result in long term economic gain for the whole family.

Not surprisingly, the Gaza labour market could not absorb the growing number of educated Palestinians. For many the attractions of emigration from the Gaza Strip were obvious. However, while the Egyptian government both under King Farouk and in the early days of Nasser's regime refused to allow the refugees to travel from the Strip into

Egypt, fewer restrictions were placed on the *Muwatinin*, especially the middle classes. Some settled in Egypt but others were able to pursue the employment opportunities which were opening up in the Gulf (Gabbay, 1959, pp.215-216). Several families in ash-Shaja'iyya have relatives in Saudi Arabia who migrated during the early 1950s. Nasser subsequently relaxed the restrictions on the movement of refugees and from 1960 (until 1978) they were eligible for places reserved at Egyptian universities. No doubt many of the university students did not return to Gaza after they had completed their degree courses.

Estimates of the number of people who migrated from the Gaza Strip between 1948 and 1967 do not exist. This is encouraging. A single figure, or even a range would suggest a degree of reliability which is not justified by the nature and quality of the demographic data available for the Egyptian period. The Egyptians maintained a *de jure* population register and made no attempt to conduct a census. According to the register, there were 455,000 Gaza Strip residents at the end of 1966. Since migrants were not removed from the list, the number includes persons living in Egypt and elsewhere. Moreover, as most commentators agree, the Egyptian estimates are inflated because of the under-registration of deaths. Thus a more realistic estimate of the total population of the Gaza Strip just before the outbreak of the 1967 war is Abu-Lughod's figure of 400,000 (Abu-Lughod, 1984, p.259).

5.1.3 Israeli occupation

There is an extensive literature on Gaza and the West Bank during the period of Israeli occupation (see, for example, Van Arkadie, 1977, Budeiri, 1982, Graham-Brown 1984a and 1984b, Heiberg and Ovensen, 1993 and Roy, 1986 and 1995). This section briefly describes the situation with respect to migration and economic circumstances.

There is little doubt that the number of Palestinians who left the Gaza Strip during the Egyptian era was small compared with the exodus of 1967-68. Accurate figures are not available but up to 100,000 residents of Gaza left or were trapped abroad and many were subsequently prevented from returning. It is reasonable to assume that of those who left between the occupation in June and September 1967 the proportion of young, single, unemployed men, the most mobile segment of the population was very high. Whatever the immediate cause of their departure, many of the young men were subsequently able to find employment in the Arab States. Their displacement coincided with a period of increasing oil revenues in the Gulf which led to an easing of restrictions on immigration.

In contrast to earlier years, when only the highly trained were admitted, the expanding economies of Saudi Arabia and the smaller Gulf Emirates required skilled and semi-skilled workers for their construction industry, government hospitals and other projects, private shops, laundries and garages (Smith, 1984, p.153).

Opportunities for employment, but only in unskilled and semi-skilled jobs also opened up in Israel. However, pay and conditions were usually poor and the long daily or weekly commutes to work were arduous. The Gaza economy entered a period of relative prosperity as money, in the form of remittances sent by Palestinians working in Arab countries and wages earned in Israel, flowed into the Gaza Strip.

5.2 Age-sex distributions of the populations

For the household survey the listing of household members was done on both a *de facto* (slept here last night) and a *de jure* (usual resident) basis. It is important to emphasise that fertility and mortality, rather than the derivation of accurate migration rates and estimates of the Palestinian population with and without rights of residence, are the focus of the study. For this reason the narrow definition of 'usual resident' was adopted (see Section 4.1.2). However, as a result, information was not collected on 30 (2.9 per cent) husbands of currently married women aged 15-49. This indicates that the definition of 'usual resident' was not adequately clarified during the interviewer training.

There were 8336 usual residents in the 1045 surveyed households. The population pyramids in Figures 5.1 and 5.2 show the age and sex composition of the *de jure* populations of ash-Shati and ash-Shaja'iyya in 1985. The broad bases of the pyramids are consistent with high fertility and a steep decline in mortality in recent years. 47 per cent of the total population were less than 15 years old in 1985 and 3 per cent were over the age of 64. Both pyramids exhibit a narrow waist and the absence of a tapering effect towards the peak of the pyramid. These features, together with the sex ratios reveal the enormous impact of differential emigration on the present population structure. In ash-Shati individuals of both sexes aged 25 to 44 are under-represented and there is a deficit of men in their late forties and fifties. Females outnumber males by almost two to one in the 40 to 44 age group but there is also evidence of excess male migration in the two adjacent age groups and at ages 30 to 34. The same cohorts in ash-Shaja'iyya are affected, but to a lesser extent. In addition, earlier male migration from this is community is indicated by the sex ratios of 0.64 for the 55-59 age group.

Some information about the timing of the exodus from the refugee camp is provided by comparing the 1985 structure with that of the *de facto* population enumerated in the 1967 census. This is also depicted in Figure 5.1. The most striking feature of the 1967 pyramid is the deficit of men in their twenties. Some would have been abroad at the time of the June 1967 invasion; others left between 6th June and the start of the census on 10th September. The sex ratios for the 20-24, 25-29, 30-34 and 35-39 age groups in 1967 are 0.58, 0.35, 0.80 and 0.69. The figures for the same cohorts in the 1985 sample - age 38-42, 43-47, 48-52 and 53-57 respectively are 0.65, 0.45, 0.79 and 0.67. Such close correspondence between the two sets is remarkable. It is important for two reasons: first, it establishes that the shortage of men in the population aged 38-57 in 1985 dates from the pre-censal period. Secondly, it suggests that the age reporting for this section of the population is accurate.

Data for ash-Shajaʻiyya are not available for 1967. Instead, the 1985 composition of the population in this community is compared with that of the whole of Gaza city of which ash-Shajaʻiyya is a constituent part (Figure 5.2). There are some similarities between the two populations. The sex ratios below unity for the 50-59 and 60-65 age groups in ash-Shajaʻiyya in 1985 correspond with the deficit of male city residents in their late thirties and early forties in 1967. For example, the number of males per hundred females aged 35-39 in 1967 is 67, the sex ratio for individuals aged 53-57 in 1985 is 54. The sex ratios for the 20-24 age group in 1967 is 0.75, that for the 25-29 cohort is 0.63. The ratios for ash-Shajaʻiyya residents aged 38-42 and 43-47 in 1985 are 0.93 and 0.71. Thus, compared with ash-Shati, a smaller proportion of Gaza city men in their twenties were outside the country at the time of the Census and the deficits of males in the same cohorts in ash-Shajaʻiyya in 1985 are also smaller than those in the refugee camp.

Correct age reporting, especially by women in their reproductive years, enhances the accuracy of fertility and mortality estimates. The regularity of the base of the ash-Shajaʻiyya pyramid and the normal sex ratios up to age 25 indicate that the reporting of the ages of the young generation in this community is reliable. By contrast, there are fewer women aged 25-29 and 35-39 and an excess in the 30-34 age group. This combination of irregularities cannot be accounted for by sex or age-selective emigration. The population distribution by single years of age, which is presented in Figure 4.1, shows that only 34 women gave their ages as 28 or 29 whereas 51 women had their ages recorded as 30 or 31. Abrupt increases in the mean number of children ever-born to

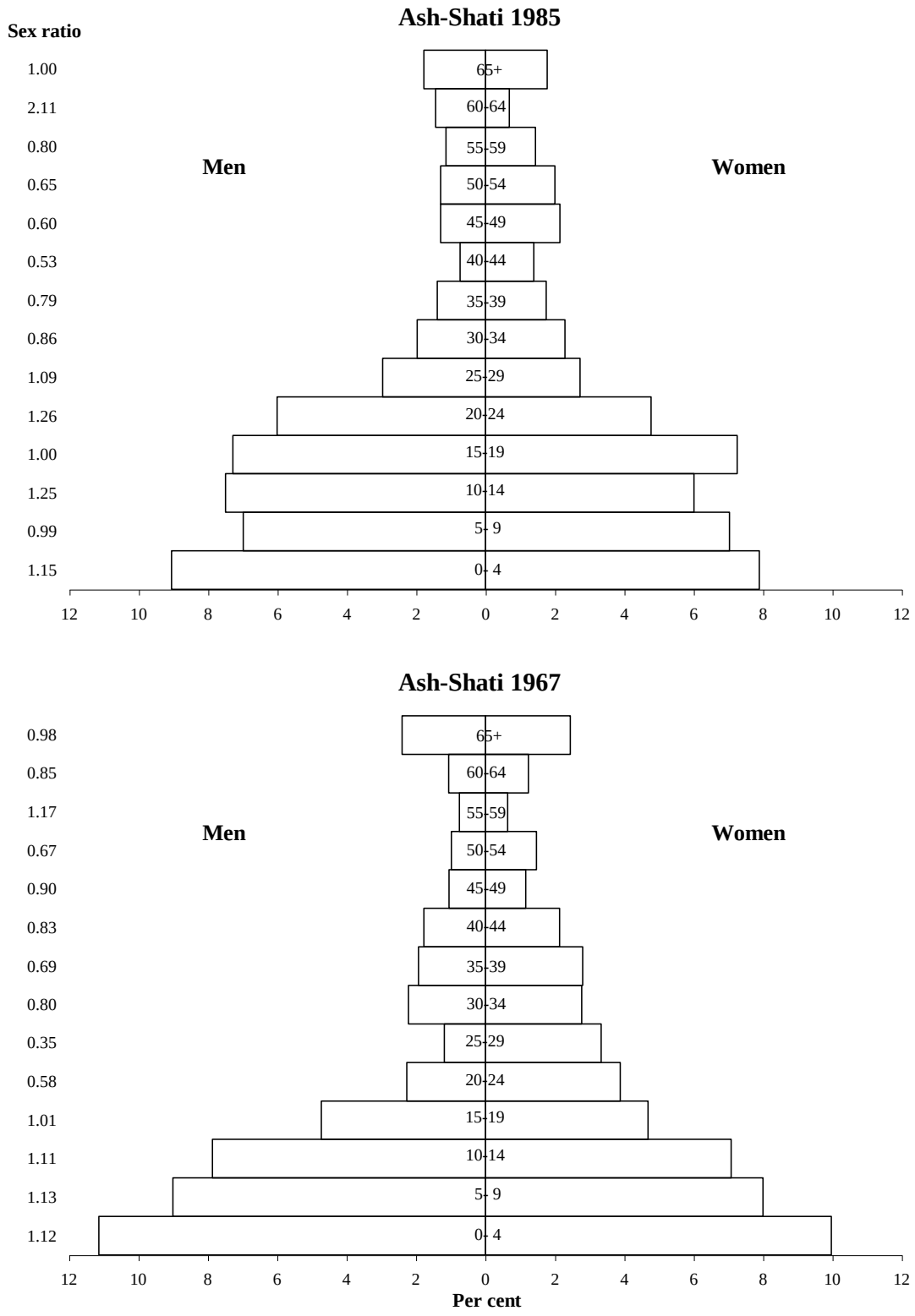


Figure 5.1 Sex ratios and percent distribution of the population by age and sex, ash-Shati, 1985 survey and 1967 Census

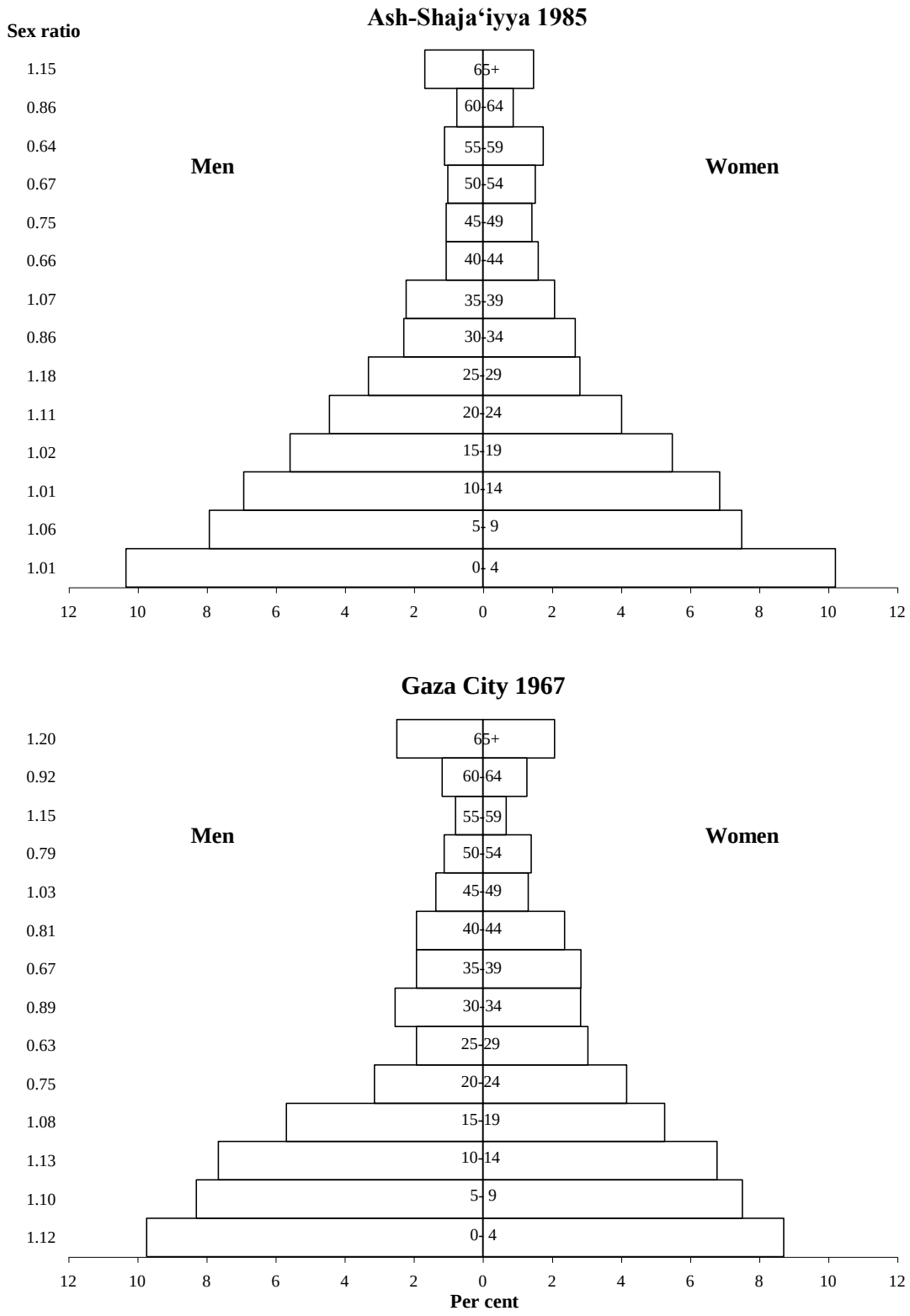


Figure 5.2 Sex ratios and percent distribution of the population by age and sex, ash-Shaja'iyya, 1985 survey and Gaza City, 1967 Census

women by single years of age indicate that age misstatement is correlated with fertility. The reported mean parities of ash-Shaja'iyya women aged 28 and 29 are 4.06 and 4.39 compared with 5.36 and 6.21 among women aged 30 and 31 (see Appendix D). The inference drawn from these figures is that a few mothers (no more than ten) in their late twenties with higher than average fertility exaggerated their ages to 30 or 31. In fact, as the details in Appendix D show, this age transference is related to the number of sons ever-born. The same phenomenon is responsible for the only other discernible error in the recorded ages of ash-Shaja'iyya women. The mean number of daughters born to women aged 35-39 is 3.1, for women in the 40-44 group the mean is 3.5. The averages for sons are 2.8 and 4.5 in the younger and older groups respectively. Again, age exaggeration of some women actually aged 35-39 who have given birth to several sons would account for this set of incompatible results. The number of women involved must be small and correcting for the identified inaccuracies does not alter the general observations made about the impact of age and sex-selective emigration.

The ash-Shati pyramid is rather distorted. The population under 20 is unlikely to be affected by differential migration. Although some males in their late teens may leave the Gaza Strip to study or work abroad and some teenage brides may join husbands living elsewhere, the numbers are probably very small and the effect on the sex ratio will be negligible if the proportions in each category are about the same. As is the case for ash-Shaja'iyya, the percentage of the population in the four age groups from 0-4 to 15-19 should decrease progressively with sex ratios of about 105 males per 100 females in each age group. In ash-Shati there are too many boys (or too few girls) in both the 0-4 and the 10-14 age groups but too few males between the ages of five and nine. Most likely the ages of some young boys were understated; some who were recorded as being less than five years old must have passed their fifth birthday. The extensive heaping on age 11 (see Figure 4.1) probably results from the exaggeration of the ages of some nine and ten year-olds. A possible explanation why ash-Shati has a poorer age distribution than ash-Shaja'iyya is that it was surveyed before the town and the interviewers' ability to elicit accurate ages from the respondents may have improved with time.

Accounting for the high proportion of the ash-Shati population in the 15-19 age group is rather more difficult. It is clear from the single-year pyramid that the deficit of individuals aged twenty is partly a consequence of heaping on exact age 18. In addition, age understatement must have contributed to the implausibly large number of women aged 17. The combination of the high sex ratio for the 20-24 age group (120) and the

slightly low ratio (100) among 15-19 year-olds adds weight to the assertion that females were more inclined to understate their ages than males. Data on the proportion of ever-married women by single years of age can be used to detect age errors which are associated with marital status and to explore the hypothesis that it is single women in particular who underreport age. A sudden increase in the proportions ever-married at the age boundaries of 19/20 would be suggestive of age misreporting. The figures for ash-Shati show that there are substantial increases in both the proportion ever-married and the mean number of children ever-born between women aged 18 and 19, and 19 and 20, and 20 and 21 (Appendix D). Such increases are consistent with the majority of women marrying and starting their families within three or four years of completing secondary school. Thus it must be concluded that the tendency of some women in their early twenties to understate their ages was independent of fertility or marital status.

The reporting errors mentioned so far can only account for a small surplus in the 15-19 age group. Indeed, there are too many males and females in both this and the 20-24 age group compared with both the younger and older cohorts. Also, the relative sizes of the 40-44 and 45-49 female and male cohorts do not conform with the expected pattern. A few women in their early forties probably exaggerated their ages, but again, as the figures on the mean number of children ever-born by single years of age show, such a tendency was not associated with fertility. Although all the ash-Shati cohorts between ages 25 and 55 have been depleted as a result of emigration since 1967, it is clear that the impact has been greatest on the 35-44 age groups and the shortfall of males aged 40-44 (sex ratio 53) cannot be attributed to age misstatement. (It has already been noted that the inference drawn from the correspondence between the 1967 and the 1985 sex ratios is that the age reporting by 38-57 year-olds is reliable.) Persons aged 40-44 in 1985 were between 22 and 26 in 1967 and it is not unreasonable to assume that young wives would be more mobile than older mothers who already had children in school. Thus assuming that, on average, women are about 30 years old when they give birth, the small size of the 10-14 cohort corresponds to the small number of women aged 40-44 in 1985 and the large number aged 15-19 is consistent with the size of the 45-49 female cohort. In the absence of any evidence of systematic age transference on an extensive scale it is concluded that the unusual distribution of the female population under 50 years old in ash-Shati is largely attributable to the effect of age-selective migration. None of the discrepancies identified will seriously undermine the accuracy of the demographic estimates for ash-Shati.

Table 5.3 Percentage of households with selected amenities and commodities, ash-Shati, ash-Shaja'iyya and Gaza Strip, 1985

Percentage of households with:	Ash-Shati	Ash-Shaja'iyya	Gaza Strip
Piped water supply	97.5	98.5	75.1
Cooking gas	92.4	91.0	84.9
Electricity	95.3	94.2	92.8
Refrigerator	79.6	82.6	77.8
Television	83.0	82.6	76.5
Toilet	99.6	98.9	97.3
Solar water heater	70.6	57.9	69.3
Washing machine	54.0	46.0	38.9
Car	40.4	59.6	14.1
Telephone	3.1	13.5	-
Land other than household plot	4.1	19.5	-

Sources: 1985 survey and Israel, CBS (1987) SAI, pp.715-717

5.3 Socio-economic characteristics (household and individual)

Table 5.3 shows the household resources and amenities in the Gaza population. Both populations appear to have similar access to amenities. As many as 98 per cent of households had a piped water supply and 94 per cent of them had electricity. Over 80 per cent of the population in both communities had access to television but washing machines, many bought second hand in the local market, were less common. The main difference between the refugee camp and the town was in the ownership of private cars and land other than the plot on which the family home was built. For example, two fifths of ash-Shati households and three fifths of ash-Shaja'iyya households reported that they owned a car. Comparison of the findings of the study communities with the same information for the Gaza Strip as a whole (Table 5.3), suggests that the survey populations were relatively advantaged. Significantly more ash-Shati and ash-Shaja'iyya households than Gaza Strip households were connected to a piped water supply. Also, with the exception of solar water heaters in ash-Shaja'iyya, the study households possessed more of every type of commodity for which data are available. Most notable is the contrast in car ownership: 14 per cent in the Gaza Strip and 40 and 60 per cent in ash-Shati and ash-Shaja'iyya respectively.

Table 5.4 and Figure 5.3 show the number of years of school attendance for women in the study population. 88 per cent of refugees and 85 per cent of ash-Shaja'iyya residents aged 45-49 received no formal education. There has been a remarkable change in the situation since these women were children. The high level of education achieved in such a short time span is impressive. In ash-Shaja'iyya the proportion of women with no

Table 5.4 Percent distribution of women by age and years of schooling

	15-49	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Ash-Shati								
None	17.9	1.7	1.5	3.6	10.6	30.6	75.5	87.6
1-5 years	11.8	13.8	14.3	7.1	11.7	8.3	14.0	6.8
6-9 years	31.6	37.2	37.8	49.1	27.7	22.2	7.0	4.5
10+ years	38.7	47.3	46.4	40.2	50.0	38.9	3.5	1.1
Ash-Shaja'iyya								
None	21.1	2.6	5.3	10.1	27.4	33.0	60.3	85.0
1-5 years	14.0	14.6	16.5	18.5	7.1	13.6	17.6	5.0
6-9 years	34.8	48.3	38.2	40.3	31.0	25.0	16.2	5.0
10+ years	30.1	34.5	40.0	31.1	34.5	28.4	5.9	5.0

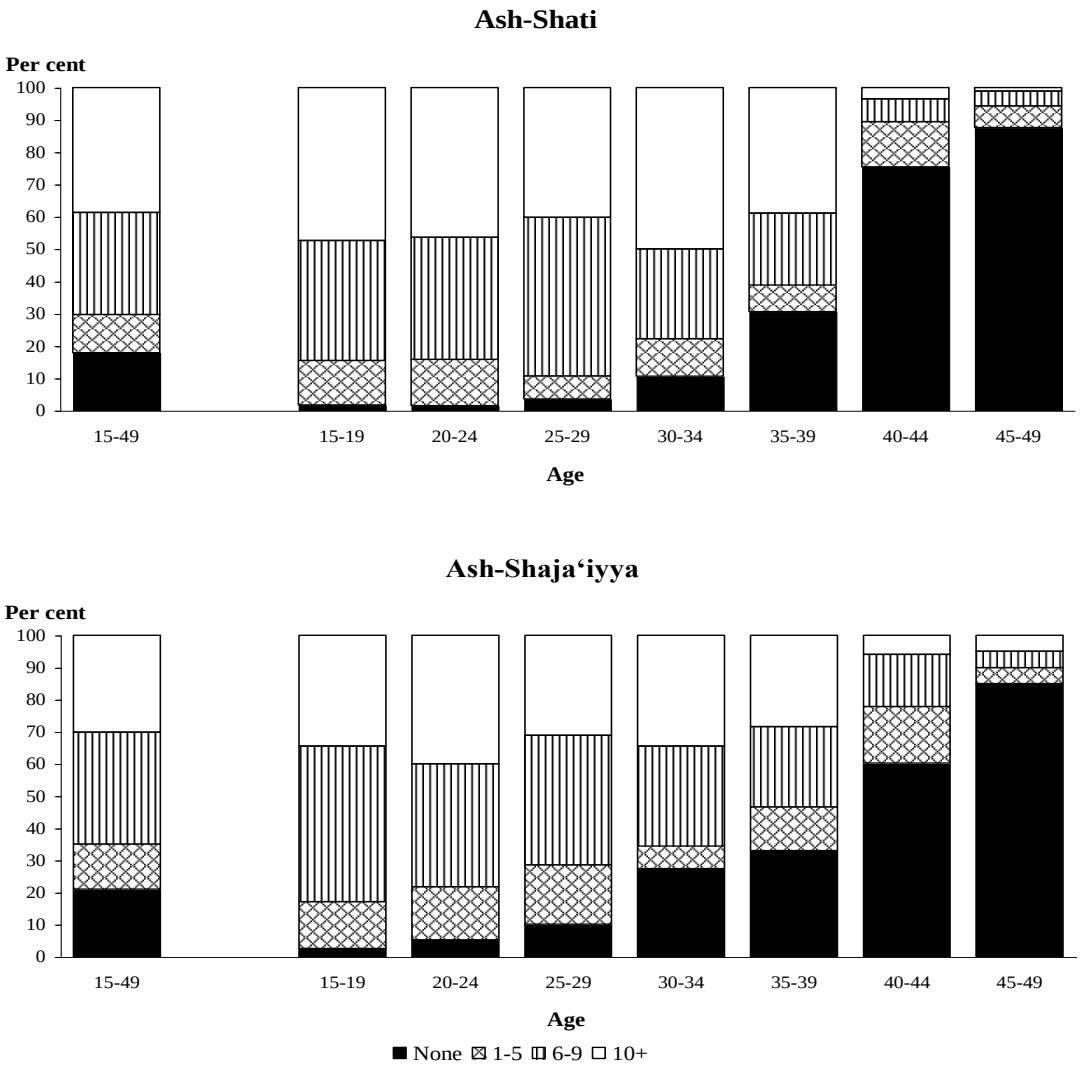


Figure 5.3 Distribution of women by age and years of schooling

schooling declines progressively in successively younger cohorts. In ash-Shati there is a particularly large difference in education between women aged 35-39 and those aged 40-44. The former group reached school age (six) between 1952 and 1956 and would therefore have been the first to benefit from the education programme which UNRWA introduced for refugees. (This correspondence between age and the opening of the UNRWA schools also adds weight to the confidence in age reporting.) The slower take-up of education by ash-Shajaʻiyya residents is indicated by the fact that the proportions of women in their late twenties and early thirties who never went to school in this community are more than double those for refugees. However, in the 15-19 age group the difference is negligible.

Several interacting factors contributed to the uptake of schooling for girls in Palestine. By the early 20th century the urban elite had started to send their daughters to school but educating the rural population was not a British priority. When preparatory schools for girls were opened in Gaza by the Egyptian government and UNRWA (United Nations Relief and Works Agency for Palestinian Refugees), those families with the closest contact with these bodies, such as their employees, were the first to allow their post-pubescent daughters to continue their education. These authorities and leaders in Gazan society legitimised the idea of schooling for girls. Their example could only have been followed on a large scale if a girl's remaining in school was not antithetical to her other functions in the household unit. In urban households young girls perform light housework - essentially cleaning and caring for their younger siblings. The work load of females of all ages is substantially lower than in agricultural communities, where the time-consuming tasks of weeding, picking and processing agricultural produce and collecting water from the well comprise an integral part of the family economy (Tamari and Giacaman, 1980). Falling adult mortality has also had a direct effect on extended family households; typically mothers-in-law continue to perform their share of the total female work load for a longer period. Thus, the absence of teenage daughters for less than 25 hours a week does not substantially disrupt the domestic work cycle. Finally, in the densely populated town and camp, distances to schools are short. This, together with the fact that all government and UNRWA institutions are sex-segregated, means that there is limited opportunity for pubescent girls to be exposed to possible dishonourable male behaviour.

CHAPTER 6

MARRIAGE PATTERNS

In this section the Gaza marriage data are examined. The aim is to identify the similarities and differences between the patterns observed in the ash-Shati and the ash-Shajaʻiyya populations and those exhibited by other Arab populations. Explanations for the findings are proffered.

6.1 Evolution of marriage patterns to 1967

Information on nuptiality trends during the 50 years prior to the Gaza survey is derived from the household schedule questions on marital status and age at first marriage. The responses to these questions are summarised by the figures presented in Table 6.1. The overwhelming majority of women aged over 50 must have married before British rule ended. The nuptiality data for these women confirm the 1944 finding (Section 2.3.1) that marriage in the first half of the century was early and universal: about a quarter of women aged 50 years or more married before 14 years, about three-quarters of them entered their first union before 18 years, and fewer than 3 per cent never married. Ash-Shajaʻiyya women who married during the Mandate were cohabiting about half a year later than those who became refugees. Earlier marriage in the rural areas of Palestine would account for this difference. Both in rural areas and in Gaza town, ages at first marriage increased slightly before the end of British rule. This gradual upward trend continued until 1967. During the period of Egyptian administration, however, women in Gaza, particularly refugees, married earlier than women elsewhere in the region. For example, the median age at marriage of women aged 45-49 in ash-Shati was 15.6 years, compared with 17.6 years for women in Jordan born at approximately the same time (Jordan, DS, 1979a, p.26). Directly comparable figures for other populations in Palestine are not available but, among Muslims in Israel who married between 1951 and 1955, the median age at marriage was 18.9 years (Israel, CBS, 1964, p.39). The gradual upward trend in the age at marriage was disrupted by the events of 1967.

Table 6.1 Ages by which 25, 50 and 75 per cent of women first married and percentage of women single at age 30 and at the time of the survey by current age, ash-Shati and ash-Shajaʿiyya

Current age group	Ages at which these percentages are ever-married			Percentage of women still single	
	25	50	75	At age 30	At interview
Ash-Shati					
20-24	16.6	19.1	-	-	39.3
25-29	16.1	18.0	24.5	-	21.4
30-34	16.3	18.4	21.5	11.7	11.7
35-39	15.8	20.0	23.5	13.9	12.5
40-44	13.4	15.5	17.3	7.0	7.0
45-49	13.9	15.6	17.9	6.8	2.3
50-59	13.5	15.2	17.3	0.7	0.7
60-69	12.6	14.4	17.3	2.0	2.0
70-79	12.7	14.6	16.8	0	0
Ash-Shajaʿiyya					
20-24	16.6	18.6	-	-	29.4
25-29	15.8	17.8	21.3	-	12.6
30-34	16.6	18.7	22.0	9.7	8.8
35-39	15.7	18.1	22.0	8.0	5.7
40-44	14.8	16.5	18.8	2.9	1.5
45-49	15.0	16.9	19.4	0	0
50-59	14.0	15.8	18.4	5.1	2.9
60-69	13.9	15.6	17.8	0	0
70-79	13.0	14.6	17.7	0	0

6.1.1 Social and institutional explanations

Social and institutional changes are responsible for the increase in the female age at marriage. In a society where it is uncommon for a man to marry a woman older than himself, a decline in polygyny would naturally result in an increase in the female age at marriage. Only 2 per cent of the ash-Shati men and 3 per cent of ash-Shajaʿiyya men were living in polygynous unions at the time of the survey. It is not possible to establish the extent of multiple marriages among the surveyed population in earlier times but these figures are considerably lower than that of 11 per cent for men in the Five Southern villages in 1944 (Palestine, DS, 1945, p.443). Clearly, in the urbanized communities of ash-Shati and ash-Shajaʿiyya, building and consolidation of political alliances through marriage is of limited importance and the social acceptability of polygynous unions has diminished.

The breaking of the nexus between menarche and marriage is an important threshold in the evolution of nuptiality patterns (McDonald 1985). McDonald suggests that in the African, Asian and Latin American populations surveyed by the World Fertility Survey, this break was brought about by the continuance of girls in school to ages beyond

puberty. But, as he argues, '… it is very difficult to distinguish cause from effect because the observed phenomena are part of a single, social process.' (McDonald, 1985, p.90). The factors which contributed to the increase in the uptake of schooling by Palestinian girls are described in Section 5.3 and the figures in Table 5.4 and Table 6.1 are consistent with an association between the expansion of female education and delayed entry into marriage. Variations in school attendance may partly explain both the difference in the age at marriage between women in their forties in the refugee camp and the town and the later marriage among equivalent cohorts in Jordan where the proportions who received secondary education were about twice as high as in Gaza (Jordan, DS, 1979b, p.540).

Conditions specific to Gaza may also have affected the age at marriage in the survey population:

> According to Badran, two factors in the 1950s contributed to [Gaza Strip] Palestinians' early marriage and thus their rising birth rates. First, their desolate economic conditions made it easy for fathers to accept a small dowry (*mahar*) for their daughters, thus encouraging the men to marry young. Second, the UNRWA gave additional rooms to each newly-wed couple, once again encouraging the youth to marry. (Hagopian and Zahlan, 1974, p.60, citing an unpublished and undated manuscript).

6.2 The impact of the occupation

For the refugees, gradual increases in the ages at which specific proportions had married extend from the oldest group of women only to the 40-44 cohort. The median age at marriage rose abruptly from 15.5 in this cohort to 20.0 in the 35-39 cohort and there is an even larger difference in the ages by which 75 per cent had married (Table 6.1). An equivalent, but less marked, rise in ages at marriage also occurred in this cohort in ash-Shajaʿiyya. Moreover, in the camp almost all women aged 30-34 married earlier than the adjacent older cohort but in the town there was little change. Most refugees aged less than 35 married later than the old city residents. Nevertheless, in the 15-19, 20-24 and 25-29 year age groups fewer women were single than in Jordan in 1983 (Jordan, DS, 1992, p.55) or among Israeli Muslims in 1983 (Table 2.6).

The disruptive effects of the war in 1967 transformed marriage patterns in Gaza. Women aged 35-39 in 1985 were aged 17-21 in 1967. Traditionally, most Palestinian marriages occurred after the harvest in late summer and even urban populations continue to favour this season. Because of the June war and the uncertainty which followed, many ceremonies for these women were postponed. Far more significant was the impact of

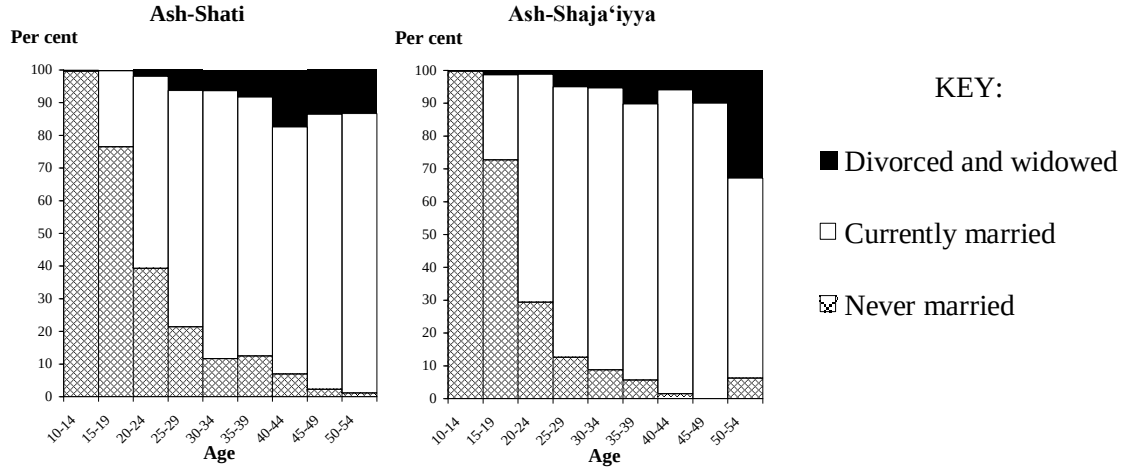
migration. The scale of the exodus of young men in the three months between the invasion and the September census is indicated by the 1967 sex ratios of 0.48 and 0.70 for the populations aged 20-29 in ash-Shati and Gaza city respectively (calculated from Israel, CBS, 1967, pp.179). The outflow to Arab countries continued after the Census and by the end of 1972 a further 11 per cent of the total population had left the Gaza Strip, including an estimated 22 per cent of women aged 20-24 in 1967 and 27 per cent of men of the same age (Gabriel and Sabatello, 1986, p.253). As a consequence of the deficit of potential husbands, the pattern of universal marriage for women was broken: 14 per cent of refugees aged 35-39 in 1985 remained unmarried till age 30 and few of them married subsequently.

6.2.1 Educational differentials

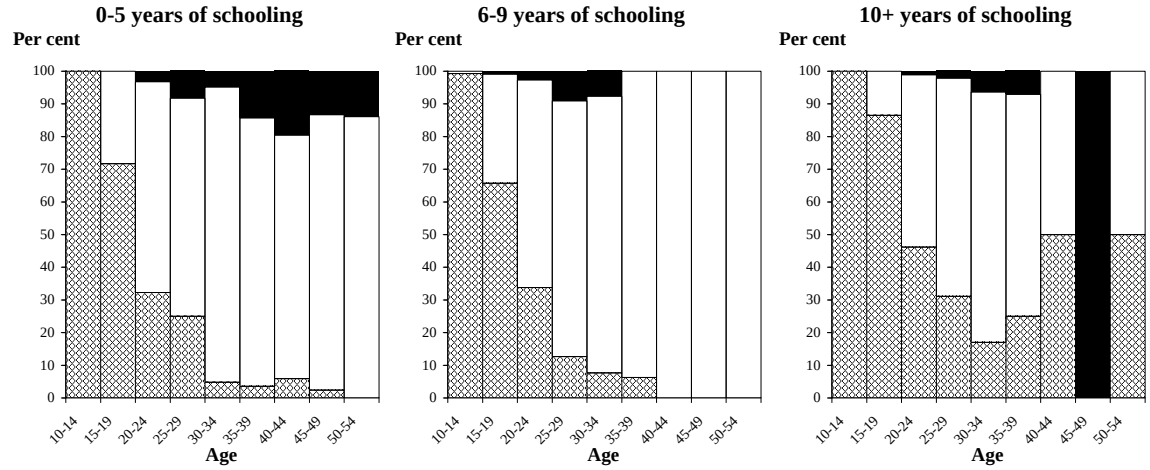
Examination of the marital status data according to age and education supports the finding of a dramatic 1967 effect. This information is summarised in Figure 6.1. In 1985, 5 per cent of refugees aged 35-39 with less than 10 years of schooling were single, compared with 25 per cent of the more educated refugees. The corresponding figures for ash-Shajaʻiyya women are 2 per cent and 16 per cent. The only Palestinian populations with more single women in their thirties than the highly educated refugees are the Christians in Israel and Jerusalem (Table 2.6 and Figure 6.2). Because they were less likely to have married before 1967, highly-educated women in Gaza were particularly affected by the shortage of marriage partners. Moreover, as noted in Section 5.3, the proportion of women with secondary education increased from 4 per cent in the 40-44 age group to 39 per cent in the 35-39 age group in ash-Shati and from 6 per cent to 28 per cent in ash-Shajaʻiyya. These changes are extraordinary and are only accounted for in part by the rapid rise in female education during Egyptian rule. The additional factor is marital status-selective emigration. Gabriel and Sabatello (1986) report that married women (and their dependent children) comprised a major portion of the early outflow of Gaza Strip residents. Assuming that this applies to ash-Shati and ash-Shajaʻiyya, relatively few of the early marrying women in the 35-39 year old cohort remained in Gaza to be interviewed in 1985.

Women who attend secondary school in Gaza marry later than their less-educated counterparts. For the most highly educated refugee group the singulate mean age at marriage for women who marry before age 30 is 21.0. For refugees with 6-9 years of schooling it is 19.5. For the same groups in ash-Shajaʻiyya the figures are 21.0 and 18.9.

An interesting finding is that women who spend between six and nine years in school marry slightly earlier than those who do not complete elementary school. The singulate mean ages at marriage for refugees and city residents with 0-5 years of education are 20.0 and 19.2 respectively. It is not impossible that in recent years men and their families have come to consider the completion of at least the first stage of the government or UNRWA cycle a desirable qualification for wives and mothers. On the other hand, the differences in the age at marriage between the lowest and intermediate educational strata could be a consequence of the small size of the former group.



Ash-Shati:



Ash-Shajaʿiyya:

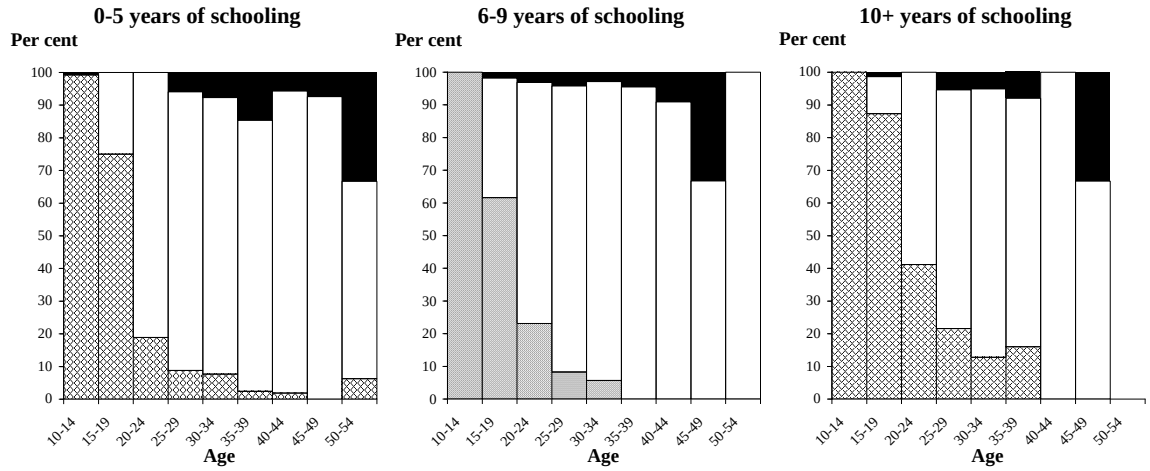


Figure 6.1 Percent distribution of women aged 10-54 according to marital status by age and years of schooling, ash-Shati and ash-Shajaʿiyya

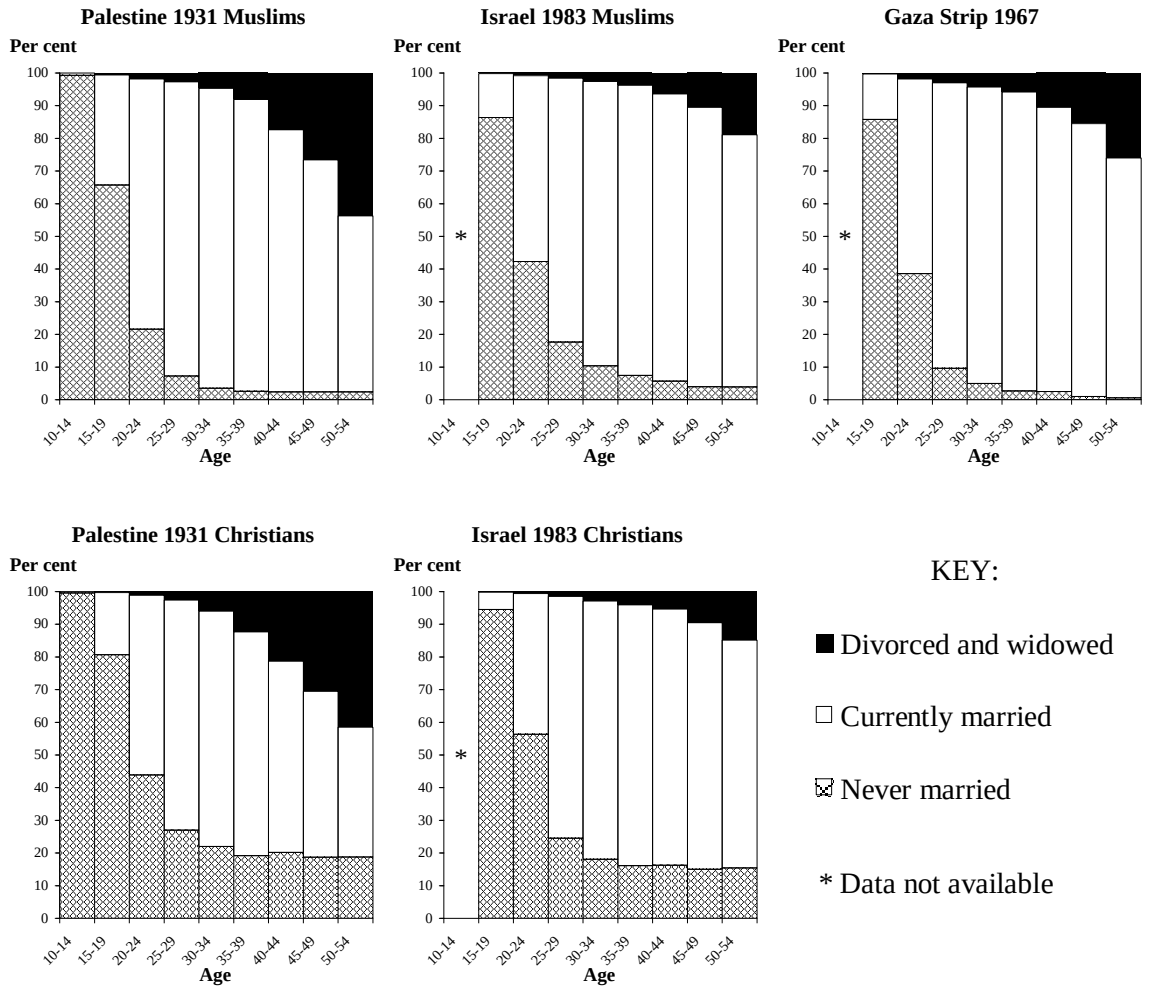


Figure 6.2 Percent distribution of women aged 10-54 according to marital status by age Palestine 1931, Israel 1983 and Gaza Strip 1967

CHAPTER 7

FERTILITY LEVELS, TRENDS AND DIFFERENTIALS

This chapter presents the analyses of the Gaza fertility data. The first two sections examine lifetime and current fertility respectively. Section 7.3 investigates fertility trends and focuses on the similarities and differences in childbearing patterns between the refugees and indigenous Gazans. Section 7.4 assesses the impact of marriage patterns, breast feeding, spousal separation and contraceptive use on fertility levels in the 1980s. For this part of the analysis, Bongaarts' proximate determinants model, described in Section 4.2.1, is applied to the survey data. Finally, the concluding discussion draws together and interprets the findings that are presented both in this chapter and in Chapter 6.

7.1 Lifetime fertility

The mean number of children ever-born to women by five-year age groups for ash-Shati and ash-Shajaʻiyya shown in Table 7.1 and graphed in Figure 7.1. Data on other Palestinian populations are also presented. The lifetime fertility measures for the women in the camp and town combined confirm the finding suggested by the broad base of the population pyramids, namely that this is a very high fertility population. The mean number of children ever-born rises from 1.3 births to women in their early twenties to 5.2 at ages 30-34 and an average of 9.0 births per woman by ages 45-49.

Comparison of the 1985 survey estimates with the means derived from the 1944 village survey (Table 2.2) and the 1967 census of the Gaza Strip (Table 7.1) indicates that, among Palestinian women in their teens and twenties, the average number of children ever-born per woman has decreased since the 1940s. But again, the trends in the two oldest age groups are in the reverse direction. For example, the means for all women aged 40-44 are approximately 6.9 in 1944, 7.7 in 1967, and 8.3 in 1985.

Differences in the lifetime fertility of women between ash-Shati and ash-Shajaʻiyya are also shown in Table 7.1. Compared with women in the city, the refugees have lower mean parities in the four youngest age groups but higher average numbers of children

Table 7.1 Mean number of children ever-born by age of women, survey population and Gaza Strip, 1967

Age group	Total	Ash-Shati	Ash-Shajaʻiyya	Gaza Strip 1967
15-19	0.18	0.15	0.22	0.16
20-24	1.34	1.21	1.49	1.41
25-29	3.12	2.77	3.45	3.62
30-34	5.17	4.90	5.38	5.22
35-39	6.21	6.35	6.09	6.81
40-44	8.26	8.53	8.04	7.70
45-49	9.04	9.46	8.44	8.21

Sources: Gaza Strip: calculated from Israel, CBS (1968a), pp. 48 & 65.

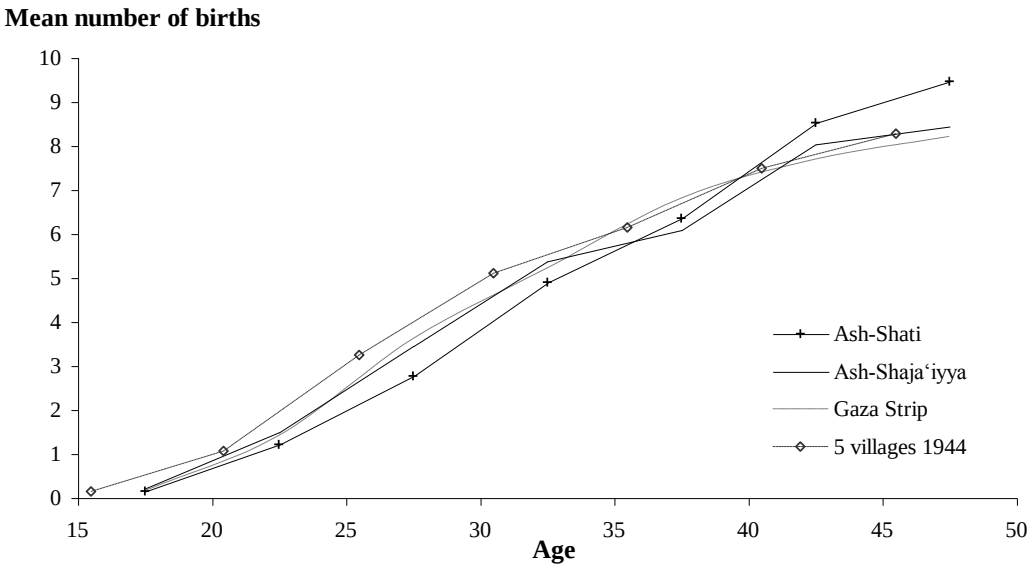


Figure 7.1 Mean children ever-born by age, all women, survey population, Gaza Strip and Palestinian villages, 1944

ever-born per woman at ages 35-39, 40-44 and 45-49. The average figures for women at the end of their reproductive period in 1985 are 9.5 children per woman in ash-Shati and 8.4 children per woman in ash-Shajaʻiyya.

The investigation in Section 6.2 reveals important changes in marriage patterns in the twenty years before the survey. For this reason, the mean numbers of births to currently married women have also been calculated. These are presented in Table 7.2 and Figure 7.2. The means for currently married women between the ages of 20 and 35 are remarkably close to those for Palestinian women surveyed in 1944 and 1967.[14]

[14] The reported average of 1.06 children ever-born by women aged 18-22 in 1944 is suspiciously low. The most likely explanation is that some children, probably those who died before the survey, were not reported by very young mothers.

Table 7.2 Mean number of children ever-born to currently married women, survey population, Gaza Strip, 1967, and Israeli Arabs, 1983

Age group	Total	Ash-Shati	Ash-Shaja'iyya	Gaza Strip 1967	Israeli Arabs 1983
15-19	0.75	0.66	0.85	1.1	0.70
20-24	2.11	2.06	2.15	2.3	1.67
25-29	3.93	3.70	4.13	4.0	3.34
30-34	5.97	5.91	6.02	5.6	4.94
35-39	7.26	7.68	6.92	7.1	6.26
40-44	9.03	9.77	8.52	8.1	6.99
45-49	9.80	10.31	9.10	8.7	7.55

Sources: Gaza Strip: Israel, CBS (1968a), p.65; Israeli Arabs: Israel, CBS (1987a), p.218.

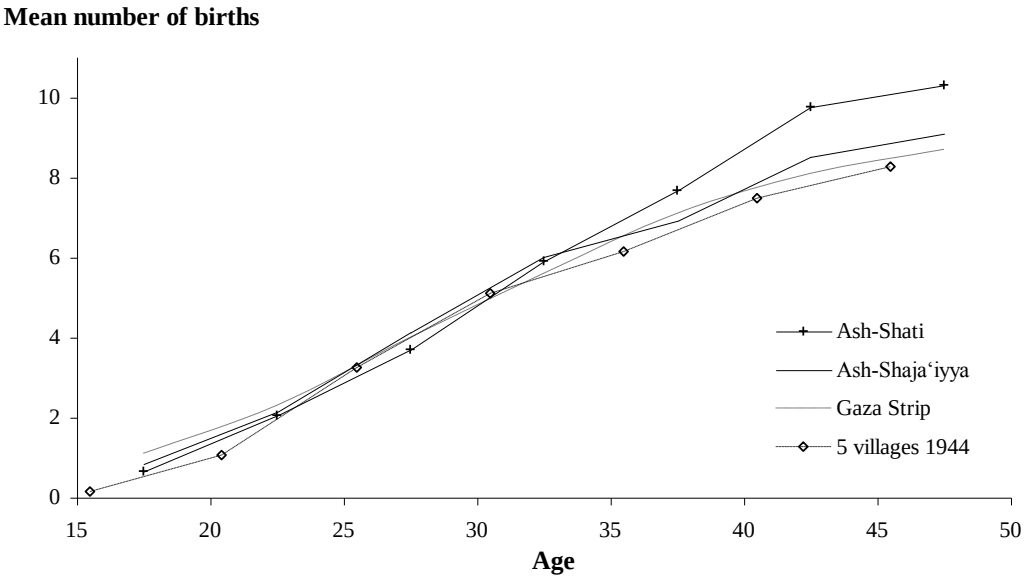


Figure 7.2 Mean children ever-born by age, currently married women, survey population, Gaza Strip and Palestinian villages, 1944

Comparison of Figures 7.1 and 7.2 sheds some light on the cause of the principal discordant feature in Figure 7.1. This is the low mean number of children ever-born by all women aged 35-39 in the survey population. The deficit for the refugee camp is wholly attributable to the large proportion of women aged 35-39 who were still single in 1985 (12.5 per cent of women compared with only 2.7 per cent single at ages 35-39 at the time of the census). The reported average parity of currently married ash-Shati women aged 35-39 is 0.6 births higher than the corresponding 1967 figure. The proportion of never married ash-Shaja'iyya women in the same cohort is also abnormally high (5.7 per cent). But, because of the heaping of high fertility women on exact age 40 (see Appendix D),

Table 7.3 Age-specific and total fertility rates, survey population and Gaza Strip, 1983-85

Age group	Total	Ash-Shati	Ash-Shaja'iyya	Gaza Strip 1983-85
15-19	0.112	0.099	0.129	0.095
20-24	0.322	0.293	0.348	0.295
25-29	0.387	0.317	0.454	0.306
30-34	0.349	0.324	0.369	0.341
35-39	0.197	0.185	0.206	0.245
40-44	0.081	0.082	0.079	0.091
45-49	0.017	0.020	0.013	0.021
Total fertility	7.3	6.6	8.0	7.0

Sources: Gaza Strip: calculated from Israel, CBS (1996), p.49.

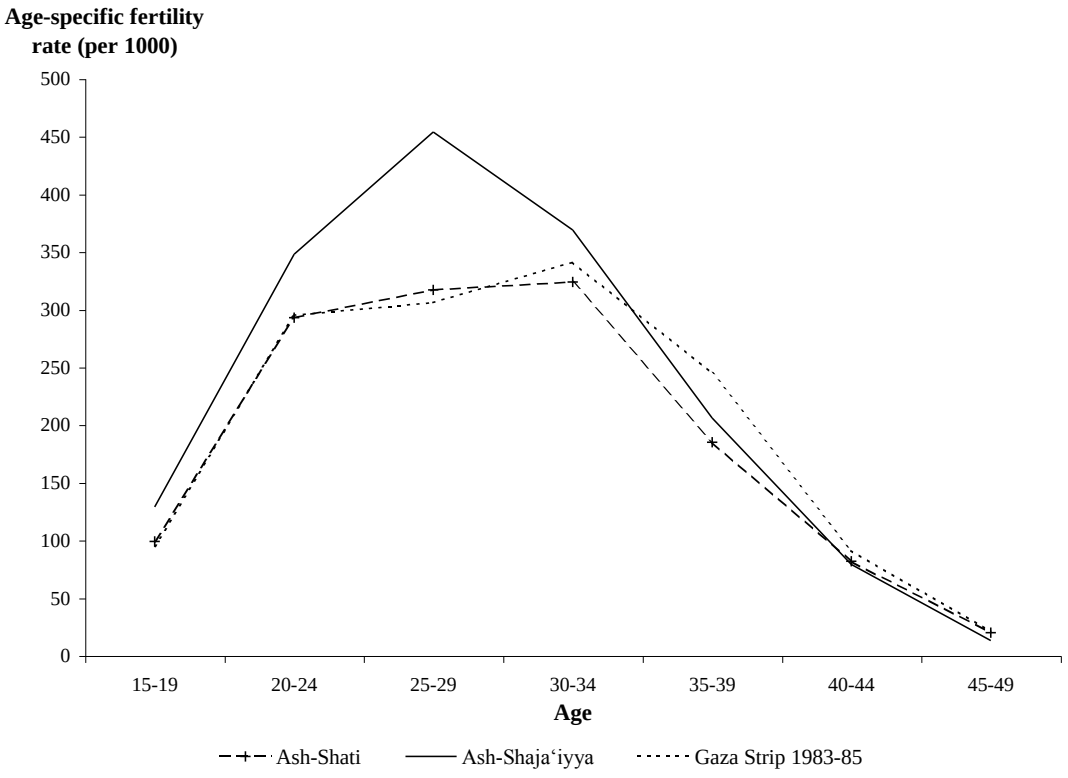


Figure 7.3 Age-specific fertility rates, survey population and Gaza Strip, 1983-85

the reported mean parity for currently married ash-Shaja'iyya women aged 35-39 is underestimated.

7.2 Current fertility

Current fertility data for the surveyed communities and comparative populations are summarised in Table 7.3. The age-specific fertility rates are calculated directly using the

births recorded in the maternity histories. The figures are the averages for the three years preceding the survey apart from the rate for the 45-49 age group which is based on the data for 1984-85 only. The total fertility rate for the population in mid-1982 to mid-1985 is 7.3. This figure is within 5 per cent of the Israeli Central Bureau of Statistics estimate of 7.0 for the whole of the Gaza Strip in the three years 1983-85 (average of 6.77, 7.44 and 6.77). Differences in the age pattern of reproduction are most easily discerned from the graphed rates in Figure 7.3. The shape of the fertility distribution indicated by the Israeli estimates for the Gaza Strip is highly unusual for a developing country population. It is the peaking of fertility at ages 30-34 that is atypical, specifically, the fact that the age-specific fertility rate of this cohort is 11 per cent higher than that of the 25-29 age group. The relative distribution of the rates for the total surveyed population, resembles the familiar developing country pattern. Fertility rises sharply up to the apex among women aged 25-29 and declines progressively after age 35 (Table 7.3). But, compared with the Gaza Strip, the level of fertility in the survey population is higher at younger ages and lower in the three oldest cohorts.

The data in Table 7.3 and Figure 7.3 indicate that there are important differences in the childbearing of ash-Shati and ash-Shajaʻiyya women in the 1980s. The period total fertility rate is 6.6 for refugees. For old city residents the reported total fertility rate of 8.0 is 1.4 births or 21 per cent higher. The total fertility rate for ash-Shajaʻiyya is, in turn, 0.7 births lower than the 8.7 recorded for three West Bank villages in 1981 (Giacaman, 1988, p.94). In ash-Shajaʻiyya childbearing peaks in the 25-29 age group. In contrast, the age-specific fertility rates reported by refugees aged 25-29 and 30-34 are almost identical. Given the small size of the survey sample, and the confidence intervals around the two age-specific rates, this finding needs to be interpreted cautiously but it suggests that for ash-Shati, the relative distribution of fertility in the peak childbearing ages is more similar to the Gaza Strip pattern.

The original plan for the fertility analyses included applying the conventional P/F ratio method to the information on births recorded on the household schedule. This would give a second estimate of the level of recent fertility. Following the detection of important defects in these data (see Section 4.3.2), the analysis was abandoned. However, since an integral function of the P/F technique is to assess the consistency of reported recent and lifetime fertility, it can be used as a diagnostic tool to evaluate the quality of maternity history data. P/F ratios for the Gaza populations are shown in Table 7.4. Apart from the information on single women which is required for the P and F denominators, all the

Table 7.4 P/F ratios by years of schooling, survey population, ash-Shati, ash-Shajaʿiyya

Age group	Total	Ash-Shati			
		Total	Years of schooling		
			0-5	6-9	10+
15-19	0.88	0.84	0.68	0.90	0.97
20-24	1.00	0.98	0.90	0.99	1.07
25-29	0.99	1.01	0.72	0.98	1.06
30-34	1.02	1.10	1.66	0.92	1.15
35-39	0.97	1.12	1.74	0.93	0.93
40-44	1.17	1.35	1.68	1.20	0.79
45-49	1.24	1.44	1.75	1.41	0.35
		Ash-Shajaʿiyya			
		Total	Years of schooling		
			0-5	6-9	10+
15-19		0.91	1.21	0.88	0.83
20-24		1.03	1.20	1.01	1.09
25-29		0.97	1.01	1.01	0.87
30-34		0.95	0.93	0.92	1.03
35-39		0.86	0.87	1.00	0.70
40-44		1.03	1.10	0.84	0.99
45-49		1.06	1.14	1.04	0.52

input data for calculating the ratios are taken from the individual questionnaire. The specific question which requires an answer is, 'Is there any reason to believe that the estimated total fertility rates of 6.6 for refugees and 8.0 for city residents are incorrect?'.

Since the P_1 and F_1 are sensitive to both sampling errors and problems associated with the age pattern of fertility (Brass, 1975, p.16), the ratios of greatest interest are those for women aged 20-24 and 25-29 - groups 2 and 3 respectively. The P/F values for these cohorts confirm that the reporting is good. For ash-Shati the P_2/F_2 and P_3/F_3 figures of 0.98 and 1.01 are evidence that the mean parities recorded for women in their twenties are consistent with the timing of their recent births. The deviations from unity for ash-Shajaʿiyya are marginally larger. Even these compare extremely favourably with, for example, the results of the 1974 Bangladesh Fertility Survey. The data in this survey yielded P_2/F_2 and P_3/F_3 values of 1.53 and 1.49 respectively (UN, 1983, p.36). The P_2/F_2 of 1.03 for ash-Shajaʿiyya is the result of either a slight underestimation of the birth rate among women whose true age is 20-24 or an overestimation of the average number of children ever-born to the same women. Errors in the opposite direction would explain the P/F of 0.97 for women aged 25-29. The most probable cause of the two irregularities is that the ages of a few 25-29 year olds of lower than average fertility were erroneously

recorded as 20-24. This explanation is consistent with the deficit of women aged 25-29 which can be seen in the ash-Shaja'iyya population pyramid (Figure 5.2).

The interpretation of the P_4/F_4 of 1.10 for refugees is that the average number of children ever-born to all women aged 30-34 at the time of the survey is 10 per cent or half a birth higher than the level indicated by the age-specific fertility rates for this and the younger cohorts during the three years before the survey. At older ages the divergences increase. For refugees, the only error identified which undermines the accuracy of the two types of fertility measures is the transference of a few women from their true location in the 40-44 cohort into the 45-49 age group (see Section 4.3.1). This could not be responsible for the large differences in the Ps and Fs for these age groups. The analysis presented in the next section provides strong evidence of a substantial decline in the level of refugee fertility during the twenty years preceding the survey. For this reason, and in the absence of any evidence to the contrary, it is concluded that the estimated P and F values for the older ash-Shati cohorts are essentially correct. In particular, the level of recent fertility indicated by the F values for women aged 30 and above are accepted as reliable. It is also inferred that the estimated total fertility rate of 6.6 is an accurate measure of the level of current fertility in the refugee camp.

According to Brass (Brass, 1975, p.15), 'If the [ratios] show a gradual decline with age, this can, in the absence of an alternative explanation, be interpreted as a memory lapse phenomenon'. Omission of dead daughters is partly responsible for the low P_4/F_4 for ash-Shaja'iyya women. Adjusting the average parities so that the proportion of dead children is the same as in the refugee camp would change the P_4/F_4 from 0.95 to 0.97. The remaining discrepancy suggests a moderate increase in recent fertility and the P_5/F_5 value of 0.86 supports this. Period and cohort fertility differentials are investigated in the following section but a recent increase in fertility is consistent with the finding that women in their late twenties married earlier than the cohorts in their thirties (see Table 6.1). In fact correcting the total fertility rate on the assumption that the F_4 is too high would change the overall figure from 8.02 to 7.86. This difference is trivial. Hence the conclusion drawn from the discussion of the P/F results for the youngest age groups in ash-Shaja'iyya is that the estimated total fertility rate of 8.0 is quite robust.

7.3 Fertility trends

The maternity histories collected in the individual survey can also be used to examine fertility trends. As noted in Section 4.2.1, cohort-period fertility rates can be useful for detecting variations in the quantum and tempo of childbearing. Cohort-period fertility rates for five-year periods before the survey for ash-Shati and ash-Shajaʻiyya women are shown in Table 7.5 and Table 7.6. These measures differ from conventional age-specific fertility rates. For example, in the period 5-9 years before the survey, women in the 30-34 cohort were aged between 20 and 29 and the cohort-period fertility rate (second column, fifth row) summarises their childbearing experience during this ten year age interval. As the midpoint of the age interval is 25, it is convenient to refer to the rate as centred on age 25. The fertility of different age groups of women as they pass through a particular age interval are compared by reading across the rows in the table. Data for cohorts are tabulated along the diagonals.

The cohort-period fertility rates for ash-Shati are presented in Panel A of Table 7.5. Ignoring the first row and the last rate in the other rows and reading from right to left, the rates reveal a gradual decline in fertility at all ages. There are only two deviations from the general trend. These are the low rate centred on age 15 in the early 1970s (0.022) compared with the rates for more recent periods, and the low rate centred on age 20 in the late 1960s (0.234). The relative fall in fertility has been greatest at younger ages. The rate centred on age 20 in the early 1980s was half the level of two decades earlier and fertility in the age interval centred on 15 fell steeply between the late 1950s and the early 1970s, although, as already noted it subsequently increased slightly. Quantification of the declines at ages over 30 are, however, rendered difficult by the atypical age pattern of fertility for women aged 45-49 at interview. The rates based on the reported dates of births for the children of these women peak in the age interval centred on 30. This contrasts with fertility peaks in the interval centred on age 25 for all younger women. Similar irregularities have been found in other retrospective surveys and can be attributed to a shifting of the dates of births towards the survey - the ‘Potter effect’ (Potter, 1977). Limited weight is therefore attached to the timing of births for the 45-49 cohort.

The mean parities of the real cohorts (Ps) at the end of each period are derived by cumulating the cohort-period fertility rates down the diagonals and these are given in Panel B of Table 7.5. These figures show clearly that every cohort up to and including women aged 35-39 experienced fewer births than the adjacent older one but the relative

Table 7.5 Cohort-period fertility rates, cumulative cohort and period fertility, and P/F ratios for five year periods before the survey, ash-Shati

Age group of cohort at end of period	Years before survey							
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)	30-34 (1950-55)	35-39 (1945-50)
A. Cohort-period fertility rates								
10-14		0.000	0.000	0.000	0.000	0.003	0.000	0.002
15-19	0.030	0.028	0.022	0.044	0.079	0.131	0.114	
20-24	0.214	0.222	0.240	0.234	0.411	0.301		
25-29	0.309	0.363	0.363	0.407	0.425			
30-34	0.334	0.349	0.375	0.447				
35-39	0.242	0.273	0.368					
40-44	0.109	0.193						
45-49	0.044							
B. Cumulative fertility of cohorts at end of periods (P)								
10-14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-19	0.1	0.1	0.1	0.2	0.4	0.7	0.6	
20-24	1.2	1.2	1.4	1.6	2.7	2.1		
25-29	2.8	3.2	3.4	4.7	4.2			
30-34	4.9	5.1	6.6	6.4				
35-39	6.4	8.0	8.3					
40-44	8.5	9.2						
45-49	9.5							
C. Cumulative fertility within periods (F)								
10-14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-19	0.1	0.1	0.1	0.2	0.4	0.7	0.6	
20-24	1.2	1.2	1.3	1.4	2.4	2.3		
25-29	2.8	3.1	3.1	3.4	4.6			
30-34	4.4	4.8	5.0	5.7				
35-39	5.6	6.2	6.8					
40-44	6.2	7.1						
45-49	6.4							
D. P/F ratios								
15-19	1.00	1.00	1.00	1.00	1.04	0.98	1.02	
20-24	0.99	0.98	1.08	1.14	1.11	0.96		
25-29	1.00	1.05	1.09	1.39	0.92			
30-34	1.11	1.07	1.32	1.14				
35-39	1.13	1.29	1.21					
40-44	1.38	1.30						
45-49	1.48							

fall in fertility between the 40-44 and 35-39 cohorts is greater than the relative decline between other adjacent cohorts. In addition, despite the timing distortions, the P values for the 45-49 cohort provide convincing evidence that these women had borne larger families by the time they reached their late thirties than women aged 40-44 at interview. Thus, at end of the 1970s, refugees aged 45-49 had borne 9.2 children on average, which is substantially more than the average of 8.5 children reported by women aged 40-44 in 1985.

Table 7.6 Cohort-period fertility rates, cumulative cohort and period fertility, and P/F ratios for five year periods before the survey, ash-Shaja'iyya

Age group of cohort at end of period	Years before survey							
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)	30-34 (1950-55)	35-39 (1945-50)
A. Cohort-period fertility rates								
10-14		0.000	0.000	0.002	0.000	0.000	0.003	0.000
15-19	0.044	0.034	0.034	0.019	0.040	0.084	0.060	
20-24	0.264	0.260	0.246	0.202	0.301	0.249		
25-29	0.395	0.412	0.365	0.397	0.389			
30-34	0.398	0.330	0.406	0.425				
35-39	0.281	0.287	0.330					
40-44	0.131	0.189						
45-49	0.046							
B. Cumulative fertility of cohorts at end of periods (P)								
10-14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-19	0.2	0.2	0.2	0.1	0.2	0.4	0.3	
20-24	1.5	1.5	1.3	1.2	1.9	1.5		
25-29	3.5	3.4	3.0	3.9	3.5			
30-34	5.4	4.7	6.0	5.6				
35-39	6.1	7.4	7.3					
40-44	8.0	8.2						
45-49	8.4							
C. Cumulative fertility within periods (F)								
10-14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-19	0.2	0.2	0.2	0.1	0.2	0.4	0.3	
20-24	1.5	1.5	1.4	1.1	1.7	1.7		
25-29	3.5	3.5	3.2	3.1	3.7			
30-34	5.5	5.2	5.3	5.2				
35-39	6.9	6.6	6.9					
40-44	7.6	7.6						
45-49	7.8							
D. P/F ratios								
15-19	1.00	1.00	1.05	0.92	1.00	1.04	0.95	
20-24	0.97	1.00	0.95	1.08	1.14	0.93		
25-29	0.98	0.96	0.94	1.27	0.96			
30-34	0.98	0.90	1.13	1.07				
35-39	0.88	1.12	1.05					
40-44	1.06	1.09						
45-49	1.08							

The parities for the synthetic cohorts (F) are given in Panel C and the results for the real and synthetic cohorts are compared (by dividing the former by the latter to give the P/F ratios) in Panel D. The P/F ratios very close to unity for the 20-24 group in the two most recent periods and for the 25-29 group in the 1980s indicate that fertility has stabilised among women of these ages in recent years. With these exceptions, those ratios derived from reliable data show decreases reading both up the columns from the oldest to the younger cohorts and along the rows from 1965-70 up to 1980-85. This pattern is

convincing proof of a considerable fall in the fertility of the refugee population during the twenty years leading up to the survey. It is important to note, however, that the decline is not smooth, in particular the ratios indicate a substantial difference between the cumulated fertility of the 35-39 and 40-44 cohorts at most ages. This feature is discussed in greater detail below.

The rates for ash-Shajaʻiyya in Panel A of Table 7.6 show small, but important, changes over time. Again there is evidence of dating errors in the reporting of women aged 45-49 but it is less marked than for refugees. The cohort with the lowest fertility is women aged 35-39. Adjusting for the errors already identified (in Section 4.3) would not alter this finding. Thus the ash-Shajaʻiyya rates provide clearer evidence of the impact on fertility of the unusual marriage patterns of the 35-39 cohort than the corresponding data for ash-Shati. Examination of the rates for fertility centred on particular age intervals reveals three broad patterns. At ages centred on 15 and 20, fertility declined up to the late 1960s, then increased, but did not reach earlier peak levels. The fertility of women aged 15-19 in the late 1950s was twice as high as the fertility of women of the same age 25 years later. On the other hand, the difference between the number of children born to the 40-44 cohort during the early 1960s and the number born to the 20-24 cohort during the early 1980s was scarcely more than 10 per cent. Secondly, except for the low fertility of the 35-39 cohort, there is very little variation in the numbers of births in the age intervals centred on 25 and 30. At later ages the third pattern is apparent: an uninterrupted, but small, decline has occurred.

The contrasting fertility trends in the camp and town populations are highlighted when the two sets of rates are compared. Until the late 1960s, refugees had higher fertility than indigenous Gazans though in both communities fertility at young ages had started to fall. From the early 1970s onward, refugees experienced fewer births at all ages and, apart from in the age interval centred on 15, the number declined as time progressed. By comparison, the changes which occurred in Ash-Shajaʻiyya after 1970, including the reduction in the number of children born to women aged 35 and above, were small.

Fertility estimates based on cohorts defined by age at survey include the experience of single, widowed and divorced women and are therefore affected by variations in the formation and dissolution of marital unions. A useful additional way of examining the data is to restrict the analysis to married women and focus on changes in marital fertility levels. Marital fertility levels are examined here by duration of motherhood (Goldman and Hobcraft 1982; Hobcraft *et al.* 1982). The method is a modification of the one

Table 7.7 Cumulative cohort fertility by duration since first birth of women currently in their first marriage, ash-Shati and ash-Shaja'iyya

Years since first birth at end of period	Years before survey						
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)	30-34 (1950-55)
Ash-Shati							
0-4	1.9	2.0	2.1	2.1	2.3	1.8	1.7
5-9	4.4	4.5	4.5	4.8	4.1	3.8	
10-14	6.7	6.6	6.9	6.5	6.2		
15-19	7.9	8.4	8.6	8.6			
20-24	9.2	10.1	10.5				
25-29	10.6	11.6					
30-34	11.7						
Ash-Shaja'iyya							
0-4	2.0	1.9	1.9	2.0	2.0	1.6	1.2
5-9	4.5	4.3	4.4	4.5	4.0	3.6	
10-14	6.5	6.6	6.9	6.4	5.4		
15-19	8.4	8.4	8.4	7.8			
20-24	9.4	9.9	9.3				
25-29	10.3	10.1					
30-34	10.1						

employed in the age-cohort analysis but the rates are calculated for periods of five-years duration since the first birth. The data presented in Table 7.7 are the cumulated numbers of children born to each cohort of mothers by the end of each five-year period. In this case the cohorts are mothers currently in their first marriage who had their first birth 0-4, 5-9, …25-29 years before the survey.

In both communities, fertility at short durations increased during the early period. Mothers who had their first child in the early 1960s achieved larger families at short durations than all other women and the tempo of childbearing was quicker in Ash-Shati than in Ash-Shaja'iyya. By the early 1970s, the trends had started to diverge. Among the refugees, modest but systematic declines in marital fertility occurred at short durations and substantial falls at longer durations. By contrast, there is no evidence in Ash-Shaja'iyya of systematic reductions in the fertility of women who had been mothers for less than 20 years. It seems likely, however, that the difference between the average of 9.4 children born to women who had their first child in the early 1960s and the 9.9 children reported by women who became mothers five years earlier, represents a real reduction in marital fertility after 20-24 years of motherhood.

7.4 Proximate determinants of fertility differentials

This section presents a more systematic assessment of the impact of marriage patterns and three other fertility-inhibiting determinants, and examines differences between population subgroups using the model devised by Bongaarts. Details of the calculations required to estimate each of the components of the model are given in Chapter 4. The model chosen to examine the impact of the proximate determinants on current fertility is:

$$TFR = TF \times C_{em} \times C_{diss} \times C_c \times C_i \times C_s$$

The results obtained from its application to the Gaza data are presented in Table 7.8 and the same information is summarised in Figure 7.4. A model provides a reasonable assessment of the intermediate determinants affecting current fertility if the estimated total fecundity rate for a population lies between 13 and 17 births per woman (Bongaarts and Potter, 1983). The figures in the last column of Table 7.8 show that the estimated total fecundity values for the study populations in total and by educational level fall within this range. Thus the inclusion of the five selected proximate determinants and the assumptions made in calculating the indices are vindicated. The interpretation of the total fecundity rate is that women in Gaza have the potential of bearing 15.8 children. In practice, in the 1980s, they give birth to an average of 7.3 infants, roughly half the potential number. The difference between the potential and the observed level of fertility is accounted for by the following fertility-inhibiting variables:

- The potential level of fertility is reduced from 15.8 to 12.1 as a consequence of the average duration of postpartum infecundability (C_i) in the study population;
- The total natural marital fertility rate (*TNM*) of 11.8 births per woman reflects the combined effect of infecundability and prolonged spousal separation;
- The use of efficient methods of contraception by Gazan couples is responsible for the difference between the total natural marital fertility rate and the total marital fertility rate (*TM*) of almost one birth (0.9);
- A smaller reduction, of 0.6 births, is explained by marital instability, both widowhood and separation and divorce;
- The difference between the total ever-married fertility rate (TM_{em}) of 10.3 and the total fertility rate of 7.3 represents the loss of union exposure. From this it can be inferred that, if all women marry on their fifteenth birthday and the other fertility-

Table 7.8 Indices of the proximate determinants and their impact on fertility by years of schooling, ash-Shati and ash-Shajaʿiyya

	TFR	*Cem*	TMem	*Cdiss*	TM	*Cc*	TNM	*Cs*	TNMS	*Ci*	TF
Total	7.3	0.709	10.3	0.953	10.9	0.919	11.8	0.972	12.1	0.771	15.8
Ash-Shati											
Total	6.6	0.669	9.9	0.959	10.3	0.878	11.7	0.974	12.0	0.773	15.6
Schooling											
0-9 years	7.3	0.726	10.0	0.952	10.5	0.885	11.9	0.964	12.3	0.774	15.9
10+ years	5.7	0.607	9.3	0.954	9.8	0.861	11.4	0.992	11.5	0.773	14.8
Ash-Shajaʿiyya											
Total	8.0	0.748	10.7	0.948	11.3	0.954	11.8	0.970	12.2	0.769	15.9
Schooling											
0-9 years	8.3	0.779	10.6	0.972	10.9	0.973	11.2	0.964	11.6	0.772	15.1
10+ years	6.8	0.642	10.6	0.951	11.1	0.891	12.5	0.984	12.7	0.759	16.7

inhibiting variables remain unchanged, the average family size in the population would exceed the observed figure by three births.

The first column in Table 7.8 shows the variations in the level of current fertility by women's education. In the refugee camp the total fertility rate for women with 0-9 years of schooling is 7.3 and that for women with at least some secondary schooling is 5.7. The rates for the same groups in the town are 8.3 and 6.8 respectively. Figure 7.4 shows clearly the extent to which the combined effect of the two components of nuptiality - delayed entry into marriage and the proportion of women never marrying - accounts for these differences. It has a greater impact in ash-Shati than in ash-Shajaʿiyya but in each community the effect is larger in the more highly educated group. As a result, the variation in the total ever-married fertility rates is much smaller than the variation in the total fertility rates. In contrast with the differential impact of the first proximate determinant, marital breakdown (C_{diss}) exerts a small and fairly uniform fertility-reducing effect in Gaza.

The estimated effect of another determinant, prolonged spousal separation (C_s), is even more limited. The husbands of ash-Shati women and of ash-Shajaʿiyya women are equally likely to be working outside the country. However, there is a consistent and important variation in marital disruption by women's educational level. In both communities the C_s index for women with less than ten years of schooling is 0.964, compared with 0.992 and 0.984 for highly educated women in the camp and the town respectively. Thus, if cohabitation were not interrupted, women with up to nine years of education would experience an additional 0.4 births whereas the average family size of their more-educated counterparts would increase by only 0.1 or 0.2 children. This

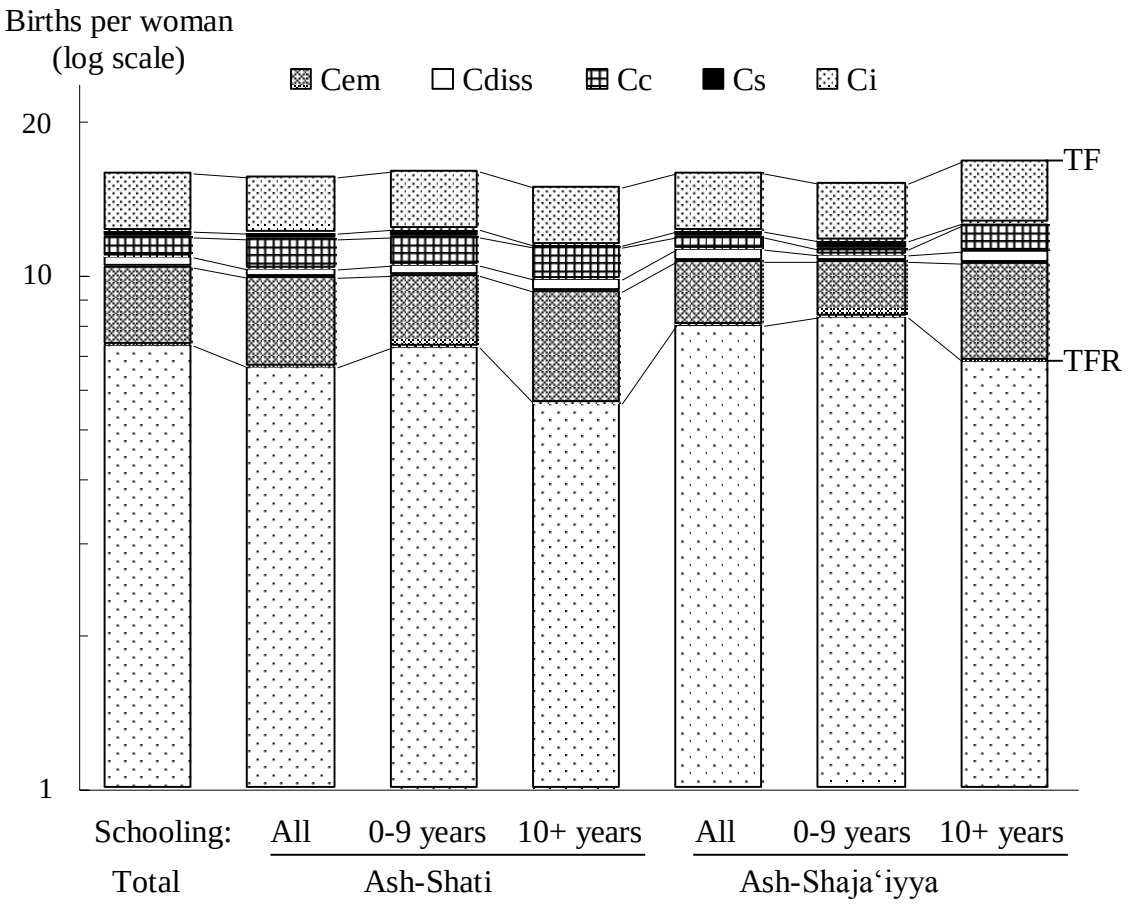


Figure 7.4 Impact on fertility of the main proximate determinants by years of schooling

differential is plausible. The spouses of highly educated women are, on average, better educated than the husbands of women with fewer years of schooling. The financial position of the highly educated men who work, for example, in the Gulf states enables them to move their families to the country in which they are employed. This option is not open to many less-skilled, poorly-paid Palestinians who work abroad.

The intermediate determinant which is largely responsible for the difference in marital fertility between ash-Shati and ash-Shaja'iyya is the use of efficient methods of contraception. This finding is not surprising since modern methods of birth control were made available in the UNRWA clinic in the camp about fifteen years before town residents gained easy access to similar services. The disparity between the total natural marital fertility rate and the total marital fertility rate for refugees is 1.4 births, for town residents it is 0.5 births. These figures are consistent with the rather small difference in the fertility of mothers in the two communities.

In most countries, increases in female education are associated with more widespread use of birth control. The contraception indices (C_c) for the educational strata in ash-Shaja'iyya conform with the expected pattern. The age-standardised proportion of women with 0-9 years of schooling who have ever used the IUD or oral contraceptives, or who have been sterilised is 13 per cent; the comparative figure for women with secondary education is 23 per cent. The estimated proportions of current users are 3 and 11 per cent (see Equation 4.5 in Chapter 4), and the contraception indices are 0.973 and 0.891 respectively. A completely different pattern is observed in the refugee camp. This is most clearly seen in the graphical representation of the impact of contraceptive use in the two educational categories in each community (Figure 7.4). The estimated fertility-inhibiting effect associated with contraceptive use by refugees in the highly educated strata is greater than that for any other group. But, unusually, there is only a moderate difference between these women and the less-educated camp mothers. 27 per cent of the former and 24 per cent of the latter report that they have controlled their fertility at some point in time. Moreover, comparison of the contraception indices indicate that even the minimally educated refugees experience a marginally larger reduction in current fertility attributable to contraceptive use than the more educated residents in the town.

Two important interrelated points are suggested by the contrasting results for the two communities. First, in the population with inferior access to contraception there is a substantial educational differential in contraceptive use. This gap is largely eroded in the population with a family planning service on its doorstep. Secondly, the prevalence rate for highly educated ash-Shaja'iyya women is almost equal to the rate for highly educated refugees. This finding indicates that the former group of women have the motivation and resources necessary to overcome the physical and financial obstacles which make practising family planning relatively more difficult in the town. On the other hand, the almost two-fold difference in ever use between the less educated groups would appear to suggest that easy access to modern methods of contraception is a major determinant of contraceptive use among less educated mothers.

A further insight into the patterns of contraceptive use is provided by the tabulation of prevalence rates by the number of living children and the number of living sons (Table 7.9). In each of the four populations the proportion of ever-married women who have used efficient contraceptives increases as the total number of living children rises. However, these data reveal two important differences between the patterns of use among the highly educated strata and the minimally educated group in the refugee camp. Only 12

Table 7.9 Percentage of ever-married women who have ever-used modern methods of contraception by number of living children and of living sons and years of schooling, ash-Shati and ash-Shaja'iyya

Living Children	Living sons				Number of women
	0-1	2-3	4+	Total	
A. Ash-Shati, 0-9 years of schooling					
0	5			5	58
1	7			7	29
2-3	10	16		12	76
4+	14	35	43	36	216
Total	8	31	43	24	379
B. Ash-Shati, 10+ years of schooling					
0	8			8	26
1	4			4	24
2-3	22	19		20	44
4+	29	43	48	44	62
Total	13	33	48	25	156
C. Ash-Shaja'iyya, 0-9 years of schooling					
0	0			0	56
1	2			2	44
2-3	11	13		12	102
4+	13	14	26	19	244
Total	6	14	26	13	446
D. Ash-Shaja'iyya, 10+ years of schooling					
0	0			0	23
1	10			10	21
2-3	23	16		20	41
4+	40	40	45	42	55
Total	14	30	45	24	140

per cent of women with two or three living children in the latter group have ever-used contraception. This figure is the same as that for the equivalent group in ash-Shaja'iyya but the rate rises to 20 per cent in both groups of mothers with secondary education. More interesting is the gradient for varying numbers of living sons. Only 14 per cent of refugees with 0-9 years of schooling and at least four children but no more than one son report using contraception. Controlling for family size, the figure increases to 35 per cent if two or three of the children are boys and 43 per cent when there are at least four male offspring. These differences are significant at the five per cent level. In contrast, highly educated women with the minimum number of sons are more than twice as likely to practise family planning and the more gentle gradients by sex composition in both ash-Shati and ash-Shaja'iyya are not statistically significant. At the other extreme, among the least educated stratum in the town, only mothers with four or more living sons report a rate of contraceptive use which exceeds 15 per cent.

In the preceding discussion, no attempt is made to discriminate between two alternative reasons for practising family planning, birth spacing and parity-specific birth limitation. This subject was not addressed in the questionnaire. However, the substantial increases in the prevalence rate as family size increases indicate that there is certainly an element of parity-specific birth spacing which, in the case of the minimally educated refugee group, also seems to be sex-specific. It is highly probable that at least some couples are using family planning for limitation purposes, but a conclusive statement on the subject cannot be drawn from the contraceptive use data.

Another surprising finding which emerges from the application of Bongaarts' model to the Gaza data is the near uniformity in the impact of postpartum infecundability across the educational subgroups. This is partly due to the insensitivity of the index to small differences in the mean duration of breast feeding (the range for the four groups is between 12.3 and 13.0 months). But age structure also plays a role. The rather similar overall mean durations of breast feeding derive from two distinct age patterns. This is demonstrated by the data presented in Table 7.10. In both communities the infants of less educated women in their thirties and forties are breastfed for longer than any other group. But, young mothers with the same level of education wean their infants three to four months earlier. By contrast, the variation by mother's age among the highly educated is negligible. Comparison across the educational strata shows that, for women over thirty, there is an inverse association between breast feeding and years of schooling. Most investigations of educational differentials in breast feeding find this pattern. However, in Gaza the direction of the relationship is reversed in the younger age groups. As already mentioned, women with secondary education who have small families are more likely than their less educated counterparts to practise birth spacing. The most plausible explanation for both this finding, and the unexpected educational differentials in breast feeding among young mothers, is that the highly educated young women are both aware of, and practise, healthy family building and infant feeding strategies.

The difference between the total fecundity rate and the total marital fertility rate represents the combined fertility-inhibiting effect of contraceptive use, spousal separation and lactational amenorrhoea. The largest effect is observed for the highly educated group in the town and the smallest for the poorly educated stratum in the same community. Intermediate between these two groups are the poorly educated and the highly educated refugee strata where the same variables exert a slightly larger impact on the group with the lower level of schooling. But the variation in the difference between the two rates is

Table 7.10 Mean duration of breast feeding (months) by age of mother and years of schooling, survey population, ash-Shati, and ash-Shaja'iyya

Age group	Total	Ash-Shati		
		Total	Years of schooling	
			0-9	10+
15-29	11.6	11.6	11.2	12.3
30-49	14.2	13.8	14.6	12.4
Total*	12.4	12.3	12.3	12.3
		Ash-Shaja'iyya		
		Total	Years of schooling	
			0-9	10+
15-29		11.6	11.1	13.0
30-49		14.4	15.1	12.9
Total*		12.6	12.4	13.0

* Age-standardised

small - the minimum is 4.2 and the maximum is 5.6 (Table 7.8). These results agree reasonably well with the cumulated number of children born by duration since first birth. At durations of less than 15 years the differences between the four educational subgroups are small. Among mothers who had their first birth 15 to 19 years before the survey, the mean number of births for the more- and the less-educated in the town and the camp respectively are 7.6, 8.5, 8.0 and 7.9. and the figures for longer durations are similar. The higher level of marital fertility among women with 0-9 years of schooling in ash-Shaja'iyya is largely explained by the low level of contraceptive use in this group. The two refugee populations experience very similar levels of marital fertility because the marginally larger fertility-suppressing effect of family planning in the highly educated stratum is compensated for by a larger spousal separation effect among women with few years of schooling. The principal difference between these two groups and women with secondary education in the town is that, on average, the latter experience a longer period of post-partum infecundability. But the important finding of the detailed examination of the proximate determinants of marital fertility is not these small variations, rather it is the absence of substantial differentials between refugees and indigenous Gazans and between the two educational groups in both populations.

7.5 Discussion

A comprehensive assessment of the determinants of fertility in Gaza requires the identification of social and demographic features and processes which the communities share with other, similar populations. An appropriate starting point is to compare the results obtained from the application of Bongaarts' model with the equivalent measures for other surveyed populations. Total fertility rates within 5 per cent of the Gaza survey figure of 7.3 were observed in Jordan in 1976 and Syria in 1978 (Jordan, DS, 1979a and Syria, CBS, 1982). According to Casterline *et al*. (1984), the best method for comparing the influence of the same proximate determinants in different populations is to consider the relative contribution of each variable to the overall reduction from the total fecundity rate.[15] The equation is given with the percentages in Table 7.11. These percentages are simply interpreted as the relative importance of each proximate variable. As data on spousal separation are not available for Jordan this variable is excluded from the Gaza figures in this table.

In Gaza, Jordan and Syria, the largest proportion of the difference between the two rates is explained by the two components of nuptiality. The higher figure, 47 per cent compared with 39 and 41 per cent, distinguishes Gaza from the other Arab populations. Explanations must be sought not only for the difference, but also for the 40 per cent which the three groups have in common. The gradual rise in the female age at first marriage, which is described in detail in Chapter 6, is not unique to the Palestinian population. Rather, by the second half of the 20th century, the same transition was in progress in all countries in the Middle East. The underlying social and institutional changes are similar, the positive association between age at marriage and the increase in the level of female education is particularly well-documented (see, for example, Farid, 1987). The singulate mean age at marriage for women who marry by age 30 are 20.6 years for Jordan and 20.5 years for Syria. The lower mean of 19.9 years indicates that, a decade later, young Palestinian women marry slightly earlier. The closeness of these three means make the difference in the marital status figures for women in their thirties even more remarkable. The proportions single at ages 30 to 34 and 35 to 39 are 5 per cent and

[15] The advantage of this approach, which is a form of standardization and involves the ratio of the total fertility rate to the total fecundity rate, is that the difference in the levels of the two rates is eliminated (Casterline *et al*., 1984, p.35).

Table 7.11 Percentage of overall reduction from total fecundity rate to observed total fertility rate which is due to each proximate determinant, selected populations

Population	Percentage of reduction* due to:				Absolute reduction From TF to TFR
	Cem	*Cdiss*	*Cc*	*Ci*	
Ash-Shati	48	5	16	31	8.6
0-9 years of schooling	43	7	16	34	8.1
10+ years of schooling	52	5	16	27	9.0
Ash-Shaja'iyya	44	8	7	40	7.4
0-9 years of schooling	44	5	5	46	6.3
10+ years of schooling	50	6	13	31	9.6
Jordan (1976 Fertility Survey)	39	4	29	28	8.9
No schooling	32	5	17	46	7.1
1-3 years	27	5	34	35	8.5
4-6 years	31	4	40	25	8.3
7+ years	42	2	44	12	10.9
Syria (1978 Fertility Survey)	41	4	23	32	8.5
No schooling	38	5	14	42	7.0
1-3 years	35	3	35	27	10.2
4-6 years	34	3	37	26	8.3
7+ years	47	1	39	13	12.1
29 African, Asian and Latin countries					
	Cm				
Early decline	41		41	18	8.6
Recent decline	41		35	24	8.4
No decline	32		11	57	6.7

* Calculated from the formula ln(*TF*)-ln(*TFR*)=-{ln(*Cem*)+ln(*Cdiss*)+ln(*Cc*)+ln(*Ci*)}. For example, the percent contribution of *Cem* = 100ln(*Cem*)/{ln(*Cem*)+ln(*Cdiss*)+ln(*Cc*)+ln(*Ci*)}
Source: Casterline *et al.* (1984), pp. 35, 54-57.

3 per cent in Jordan, 8 per cent and 6 per cent in Syria, and 10 per cent and 9 per cent in Gaza. It is this higher proportion of women age 30 to 39 who have never married which is wholly responsible for the excess fertility-inhibiting impact of the Gaza nuptiality pattern. In Chapter 5 and Chapter 6 it is argued that the deficit of potential husbands in Gaza is a consequence of both economically motivated migration and one political event, the 1967 Israeli occupation of the Gaza Strip. Again, this conclusion is reinforced by comparison of the Gaza situation with that prevailing in Jordan and Syria. Out-migration from these countries is responsible for the abnormally low sex ratios in all groups between the ages of 20 and 44 (Blacker *et al*., 1983, p.10 and Syria, CBS, 1982, p.23). But, unlike many Palestinians from the Occupied Territories whose temporary absence in 1967 resulted in their being denied residence rights by the Israeli authorities, Syrian and Jordanian nationals are free to return to their countries of origin at any time. Thus the migration process has not disrupted the marriage markets in Syria and Jordan.

A factor which is frequently observed to play an important role in the delayed entry of educated women into marriage is their higher labour force participation rate. However, only 2 per cent of currently married women interviewed in the Gaza survey were engaged in full-time paid work. More surprising is the limited variation in activity rates by educational achievement. Only 2.5 and 3.3 per cent of married women aged 23 to 49 with 0-9 and 10 plus years of schooling are economically active. The mean age at marriage for highly educated working women who marry before age 25 is 1.8 years higher than that for the corresponding group of housewives. This compares with a difference of only 0.1 year for working and economically inactive women with no secondary education. Neither these differences, nor the difference in the age at marriage of 18.3 years for all employed women and 17.6 years for non-workers, are statistically significant. However, since it is not possible to isolate those women who worked before marriage from the currently inactive group, the differences may be larger. More convincing evidence of a positive relationship between educational attainment and employment is provided by the economic activity rates for single women. The rates for more- and less-educated single women aged 23 and above are 45 and 23 per cent respectively. This variation is significant at the five per cent level.

Does work in the public domain diminish women's chances of ever marrying? This idea was first put forward by Nisrine, my assistant. During the search for interviewers to conduct the survey Nisrine proposed that we approach Fatima, a teacher living in Dayr al-Belah refugee camp. En route to the camp Nisrine remarked, 'Of course, Fatima's brothers wouldn't allow her to marry because they didn't want to lose her dollars'. At the time I dismissed the comment. Later, the experience of one of the interviewers reminded me of Nisrine's assertion. One year after the survey I learned that Amal, an interviewer from Jabalya refugee camp had finally secured paid employment. A trained laboratory technician and the oldest of seven children, Amal's modest earnings from interviewing were her family's sole source of income at the time of the survey. At 22 she had not paused to question her duty to support her parents and siblings. In 1986 Amal accepted a post in a hospital in Saudi Arabia. Because the post was not open to unaccompanied women, her illiterate father took on the role of escort and migrated with her. It is only possible to speculate about future changes in Amal's marital status. Certainly, at the time of her move to the Gulf, finding a husband for her was not her parents' priority. And, since UNRWA's post-secondary scholarships are limited to one per family, Amal will

have to bear the costs of any training to enable her younger brothers to replace her as the family's principal economic provider.

The cross-sectional nature of the survey data precludes a definitive answer to the question about the effect of employment on change in marital status. But examination of employment rates for women aged 30 to 49 with post-secondary vocational training or university level education - the best available proxy for work before marriage - is informative. Two-thirds of the 18 women worked full-time, all were engaged in skilled or salaried jobs, principally teaching. Three quarters of the economically active were single compared with only two of the six who were not in paid employment, a difference which is significant at the ten per cent level.[16] This result provides tentative support for the argument that the older cohorts of very highly trained women in Gaza have experienced reduced marriage prospects. The extent to which men regard women with experience beyond the traditional sphere of the household as potentially inferior homemakers cannot be ascertained. Nor is it possible to establish whether the prospect of forfeiting their daughters' earnings discouraged the parents of these women from facilitating marriages for them. Moreover, it is not inconceivable that the observed pattern is related to the shortage of men, particularly of men with equal or higher qualifications. Any pre-existing tendency to rely on daughters for material support would have been enhanced during the period of economic insecurity which prevailed immediately after the occupation.

A simplified summary of the determinants of the observed marriage patterns in Gaza is presented in Figure 7.5. The prevailing average age at first marriage and proportions of women who never marry together account for almost half of the reduction from the total fecundity rate to the observed total fertility rate. The fertility-suppressing effect of these two proximate variables is the ultimate outcome of a combination of social, economic and historical factors. These operate via a plurality of pathways. In common with other Arab populations, social change in Palestinian society has resulted in a break in the nexus between menarche and marriage, increased school attendance and the participation of women in the labour market. But intergenerational differences in marriage patterns in ash-Shati and ash-Shaja'iyya are not simply the consequence of gradual change. Rather, the study also identifies ways in which political events and the contingent economic

[16] Comparable data for Syria and Jordan are not published. But, in 1976, only 12 per cent of the 137 Jordanian women aged 30 to 49 with vocational or university education had never married (Jordan, DS, 1979b, Vol. II, p.540). The Gaza figure is 61 per cent.

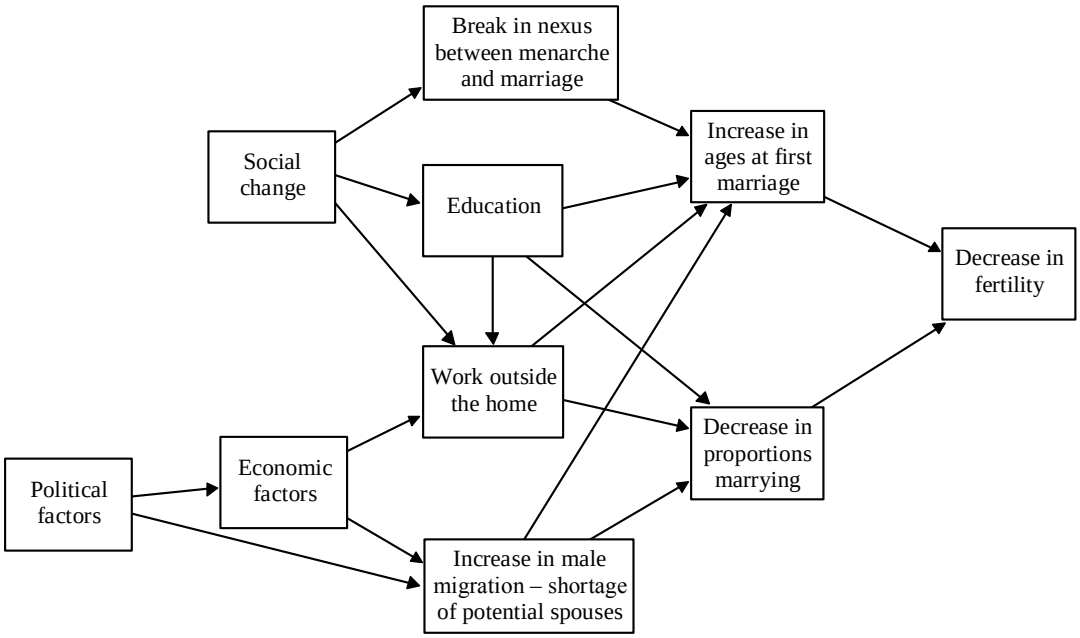


Figure 7.5 Schematic representation of the factors that combine to suppress fertility via the nuptiality variables

disruption affect the two nuptiality variables. The simplest and clearest route is via the availability of marriage partners. A more complex interrelationship for which there is some evidence is that between family subsistence, the education of daughters and the postponement of marriage or even the enforced single status of some of these women. It is these unusual experiences which distinguish the Gaza population from the residents of Jordan and Syria.

The fertility-depressing effect of marital dissolution is also relatively more important in Gaza than in Jordan and Syria. But in all three populations the overall contribution of this proximate variable is small. The current status data for women reveal almost identical proportions widowed by age. The difference is accounted for by proportions divorced or separated of four to six per cent in all groups between ages 25 and 44 in Gaza compared with only one per cent in the corresponding Jordanian and Syrian cohorts. It is tempting to attribute the higher divorce and separation rates in Gaza to the stress placed on marital unions by the occupation. Economic hardship could be the critical determinant. For example, it has been shown that unemployed British men are more likely to experience marital breakdown than men who remain in employment (Moser *et al*., 1986). Marriages of couples separated by the imprisonment of one partner are also prone to failure. But,

since the decision to dissolve a partnership is only the final outcome of a complex process and because the social circumstances of divorcees in ash-Shati and ash-Shaja'iyya have not been investigated, no conclusion can be drawn about the causes of the high marital dissolution rate.

No surprises are revealed by the comparison of the impact of the proximate determinants of marital fertility in Gaza, Jordan and Syria (Table 7.11). Syrian and Jordanian couples are more likely to use modern methods of contraception. Even women with as few as one to three years of schooling in these two countries report current use rates which are significantly higher than the estimated figures for the most highly educated strata in the study population.

The mean duration of post-partum infecundability in all groups in Gaza is greater than or equal to the means for the lowest educational groups in Jordan and Syria. The greater relative impact of this proximate determinant in the two national populations is explained by the smaller fertility-reducing effect of the marriage variables in the same groups. The mean duration of the post-partum infecundable period among ash-Shati and ash-Shaja'iyya mothers is remarkably long. In the preceding section it is argued that these women prolong breast feeding in order to optimise on the health benefits of maternal milk. The contrasting results for the most highly educated strata in Jordan and Syria support this conclusion.

If further proof of the unusual fertility pattern in Gaza is required, comparison of the Gaza results with the data presented in the final panel of Table 7.11 provides it. These figures represent the average relative fertility-reducing impacts of the three proximate determinants in 29 African, Latin American and Asian countries which conducted fertility surveys during the 1970s. Figures for the average absolute reduction between the total fecundity rates and the total fertility rates are also given. On the basis of the latter measure the Gaza population would be allocated to the recent decline group. The same result is obtained if the criterion used is the percentage of the observed reduction due to infecundability. If judged by the contraception contribution Gaza would be placed in the no decline category. On the other hand the relative contribution of nuptiality is substantially larger than in the countries which experienced an early transition in fertility.

Trends and differences in marital fertility are examined in the earlier parts of this chapter. A variety of approaches are applied. A simple picture emerges. The sum of the evidence of marital fertility limitation amounts to very little. In some populations sustained high levels of marital fertility are attributed to poor or no access to modern

methods of contraception. In the case of Gaza this simple explanation is dismissed. There is no doubt that, in the 1980s, large families are acceptable and even desirable in the two urban communities. The detailed examination of the prevailing social organisation which follows, attempts to explain why large families may be advantageous.

After 1967 the Gazan economy was progressively integrated with that of the occupying country. Israeli capitalist development flourished and the West Bank and Gaza Strip provided an unlimited supply of cheap, unskilled labour. By 1972 the territories had become the second most important export market for Israeli commodities after the USA (Hilal, 1976). There has been a parallel decline in the productive sectors of the indigenous Palestinian economy. However, neither the increase in employment abroad and in the non-familial service sector in Gaza nor the increase in proportions of the active population engaged in wage labour in Israel has succeeded in eroding the importance of familial ties. In contrast to the experience of the Indian villagers studied by Caldwell *et al*. (1982), the older generation in Gaza have little reason to fear that migration abroad or employment in Israel will enable their sons to establish independent households. Rather, political and economic factors reinforce the interdependence of the generations in the Gazan family.

Persons working in the Gulf not only inform relatives and friends of job vacancies, they also frequently provide crucial assistance in ensuring the necessary documents, visas, work permits, etc. are issued by the employers and bureaucracies of the host countries, and often accommodate the new migrants upon their arrival. Likewise, only a minority of Gazans working in Israel and Israeli employers utilise the services of the Government Labour Office in Gaza. Even when pursuing an advertised vacancy in UNRWA, the intervention of a *wasta* (connection/middleman) is assumed to, and may well, enhance the prospects of an applicant.

Fearing the political consequences of being outnumbered by immigrants, the Gulf state governments ceased giving citizenship to their guest workers shortly after the oil boom and the expansion of their economies began. During the 1970s and 1980s all immigrants were granted short-term work contracts and faced the prospect of repatriation if the contracts were not renewed and they were unable to find another job. For Gazans, the Strip represented long-term (relative) security. Most returned every summer bringing their surplus earnings with them. These remittances were used for the general upkeep of the family, including, perhaps, the migrant's wife, the education of siblings, the cost of the migrant's or his brothers' *mahr* or for housing improvements. Eventually, if enough

capital was amassed, a plot of land could be bought and a house built. However, the high price of land in Gaza city (approximately US $150 per square metre in 1985, according to local informants), and building costs, and the absence of any loan/mortgage facilities, renders it impossible for most individuals to contemplate building a home on their own. A more common occurrence is for brothers to pool their resources and build a house or small block of flats, room by room or storey by storey as is often necessary (Graham-Brown, 1984a). The new premises are then occupied by related nuclear families.

The precarious position of migrants was subsequently borne out by their experience following the 1990 Iraqi invasion of Kuwait and the Gulf war. About 300,000 Palestinians and Jordanians (mostly Palestinians) were displaced from the Gulf region and an estimated 54,000 Palestinians returned to, or were stranded in, the Occupied Territories (Van Hear, 1993, pp.74 and 77). As holders of Egyptian travel permits, Gazans were even more vulnerable than residents of the West Bank who travel on Jordanian passports and had the option of staying in that country when they were forced to leave the Gulf. Without the support of the extended family the situation of the workers who returned to Gaza would have been even more desperate.

The employment situation of most Gazans working in Israel is equally insecure and they enjoy none of the financial compensations which once made migration attractive. The wages of labourers from the territories are between 40 and 50 per cent of the Israeli average (Roy, 1986, p.33 and Tamari, 1980, p.91). In addition, social security payments are deducted but Gazans receive none of the services - unemployment benefit, sick pay and pensions - which Israelis receive in return for the payment of these taxes. Most Palestinians from the territories are employed without contracts and can be dismissed at any time. Since they are generally forbidden to live in Israel (although some save money by staying overnight in Israel illegally), a substantial proportion of their income is spent on daily commuting costs.

Lack of job security and the below-subsistence wages perpetuate the dependency of the individual earner on the extended family both during periods of unemployment and, more generally, because of the high cost of living especially housing. At the same time, in the absence of any other institutional support mechanisms, most of the economically inactive older generation must rely on their sons to provide for them financially.

Numerous aspects of the culture in Gaza attest to the preference for sons. The arrival of a boy is celebrated on the seventh day after the birth by the provision of a meal including meat for family and friends. When a girl is born only sweets are served. Even

the naming of girls can indicate their inferiority. One woman from ash-Shaja'iyya who was interviewed had given birth to 11 children, only the first and fifth were boys. The fourth girl was named *Khitam* (ending, the end), the seventh *Kifayya* (enough, sufficiency), the eighth *Nihayya* (the end). Another common name for Palestinian girls is *Tammam* (completion, complete).[17] *Umm* Nabil, the mother of Nabil, her firstborn in ash-Shati was asked how the name of Suzanne was chosen for her daughter. She recounted that when the girl was born, (she already had three healthy sons and another daughter), her husband did not bother to visit her in the clinic. Several days later *Umm* Nabil's *durra* (co-wife) gave birth to her second son and the husband was at the clinic within hours. *Umm* Nabil described how she and her female relatives sat and discussed which girls' name would cause the greatest irritation to *Abu* Nabil (the father of Nabil). They decided on a foreign/Christian name since *Abu* Nabil was a pious Muslim.

The starting point for all discussions of the ideal number of sons for a family in Gaza was a figure of two. There was no question about the need for one son, the family name passes only through the male line and there has been no change in the fact that a woman's position in society is only established after she has given birth to a son, hence the respectful term of address, *Umm* Nabil. Moreover, when the young generation were asked about the practice of polygyny, there was a general consensus that a woman had only two reasons to fear that her husband would marry a second wife;- if she was infertile or gave birth only to daughters. In the event that the first son should turn out to be *mush nafi'* - in this context, irresponsible in family terms - two or three sons were considered desirable. Older women agreed that it was no longer necessary to give birth to more than this number to ensure that one or two survived to adulthood.

The very tiny proportion (two per cent) of currently married women who are engaged in full-time work is perhaps the single most important indicator of the position of married women in ash-Shati and ash-Shaja'iyya. In these communities childbearing, childrearing and looking after the welfare of the family are accepted by the young, as well as the old, as the primary role of married women. The depressed nature of the economy, the limited

[17] The European literature also provides examples of names which indicate the unwelcome arrival of another daughter:

> When they came to announce to the King [Louis XV of France] that another girl had been born instead of the Duke of Anjou whom he expected, someone asked him whether she would be called Madame Seventh. He answered: *Madame Last*. Whence it was concluded that the Queen would be very neglected (*Memoirs of the Marquis d'Argenson*, July, 1737, cited in Van de Walle, 1992, p.487)

number of positions available in socially acceptable types of employment (principally teaching), and the vital contribution women make to the household economy through their unpaid labour, perpetuate their confinement to the home. The population is exposed to alternatives. Numerous Gazan men at least have frequent contact with Palestinian men residing in Israel and Jerusalem where many more married women are active in the labour force. And working mothers are portrayed, not always favourably, in some of the Egyptian TV soap operas which are watched by all. If there is a hint of change it is the relatively high rate of contraceptive use by women with secondary education who have no more than one living son. Even if they are unable to participate in activities outside the home it is quite conceivable that most of these women will limit their families to a number which does not approach the average of nine or ten births experienced by their mothers' generation.

CHAPTER 8

CHILD MORTALITY LEVELS, TRENDS AND DIFFERENTIALS

In this chapter the infant and childhood mortality estimates obtained by applying the methods described in Chapter 4 to the survey data are presented. Throughout the chapter the internal consistency of the mortality data is examined in an attempt to assess the reliability of the results. In Section 8.1, mortality levels and trends for the total population and the two communities are examined. Section 8.2 discusses the changing age pattern of mortality at young ages. The following sections explore and summarise determinants of mortality by looking at mortality differentials. These include differentials by gender, by maternal factors (maternal age, parity, birth interval), and by socio-economic determinants (maternal and paternal education, crowding, and household wealth). The expected relationship between most of these measures and mortality is discussed in Chapter 3. The extent to which results from the Gaza survey agree with these findings is assessed here. The analysis is primarily descriptive. It aims to identify the absolute and relative risks of dying experienced by different groups of children. The confounding between risk factors, and the extent to which the mechanisms via which the important variables affect mortality can be identified, are examined in Chapter 9 and Chapter 10.

8.1 Estimates of infant and child mortality

The life table measures, ${}_1q_0$ and ${}_5q_0$, calculated by applying the indirect method to both the household questionnaire and the maternity history data are presented in Table 8.1, together with the years to which they apply. The Coale and Demeny West model of mortality was used for all estimates (Coale and Demeny, 1983). The choice of this model is discussed in the context of the age pattern of mortality in Section 8.2. As noted in Section 4.3.2, there is an underestimation of the number of children ever-born in the household questionnaire which resulted in an overestimation of the proportions of children who had died among women aged 25 and above. Since the rates derived from the birth history information are clearly more accurate, all further discussion of indirect estimates will refer to those calculated from the maternity histories.

Table 8.1 Infant and childhood mortality rates: comparison of estimates calculated indirectly from household questionnaire and maternity history data

Household questionnaire			Maternity history		
$1000._1q_0$	$1000._5q_0$	Date	$1000._1q_0$	$1000._5q_0$	Date
23	27	1984.4	23	28	1984.4
31	38	1983.2	31	37	1983.2
45	57	1981.3	46	58	1981.4
60	81	1979.1	56	75	1979.2
76	100	1976.6	69	95	1976.7
108	157	1973.9	96	137	1974.0
89	127	1970.9	78	109	1971.0

Note: Calculated using Trussell's regression equations and Coale and Demeny (1983) model life tables.

The trends in infant and childhood (under age five) mortality over time are shown in Figure 8.1 and Figure 8.2. The graphical presentation of the estimates calculated indirectly from the maternity histories demonstrate one feature which arises from errors in the data. This is the 25 per cent increase in mortality between the years 1971 and 1974. While some fluctuations in mortality levels are to be expected, this difference is more likely to be attributable to both the age exaggeration of some ash-Shati women in their early forties and the under-reporting of child deaths by women actually aged 45-49. The latter feature is indicated by the implausible lower proportions of dead children among ash-Shaja'iyya women aged 45-49 compared with the 40-44 group (Table 8.2). Taking into account these two factors, the level of mortality was probably slightly lower than the estimate for 1974 and considerably higher than that for 1971.

The figures in Table 8.2 show two other defects in the data: the reported proportions of dead children for women aged 20-24 in ash-Shati and for women aged 30-34 in ash-Shaja'iyya are too low. In both cases the errors are a result of the misreporting of the ages of young women. Some ash-Shati women aged 20-24, together with the births and child deaths experienced by these women, are incorrectly located in the 15-19 age group. In ash-Shaja'iyya it is the transfer of women from the 25-29 age group up to the 30-34 age group which is responsible for the lower than expected proportion of dead children in the latter group.

Selected mortality rates for five-year periods before the survey are presented in Table 8.3. These rates are calculated directly from the data in the maternity histories and are also depicted in Figure 8.1 and Figure 8.2. The numbers of births on which the rates are

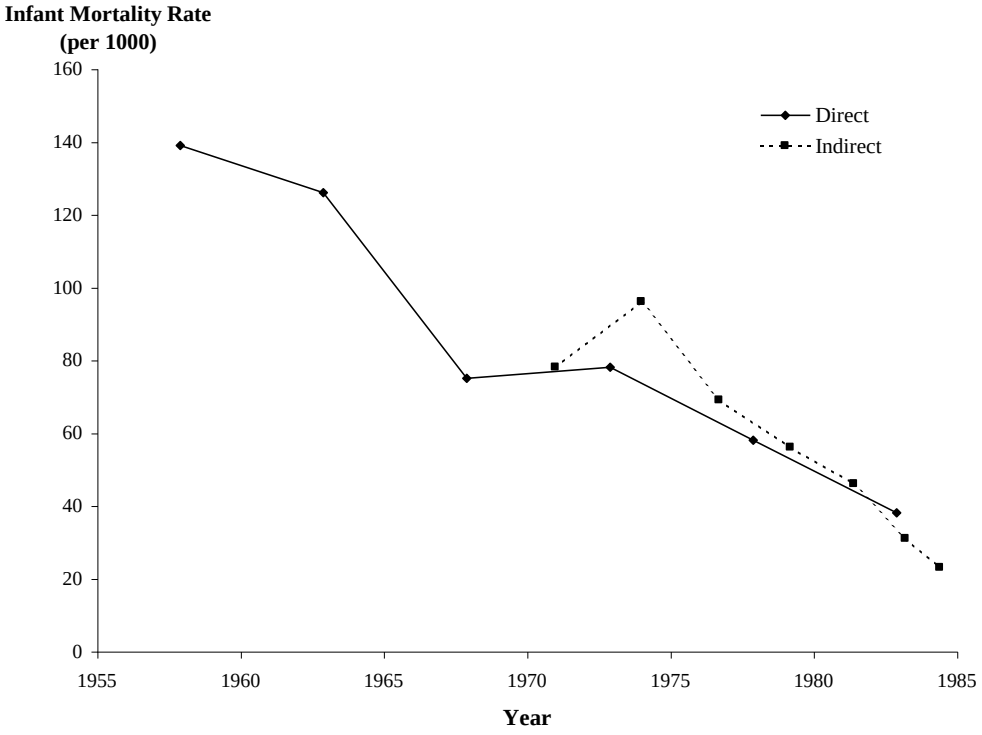


Figure 8.1 Trends in infant mortality estimated from the maternity history data

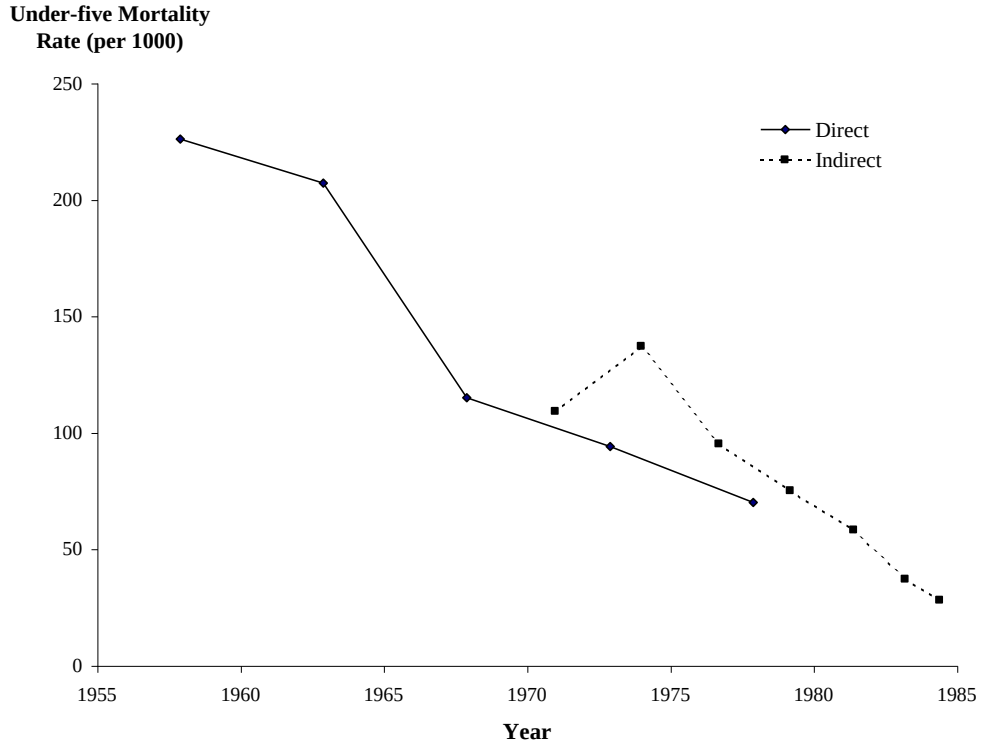


Figure 8.2 Trends in under-five mortality estimated from the maternity history data

Table 8.2 Proportions of children ever-born that have died by age group of mother

	Proportion of children dead		
Age group	Total	Ash-Shati	Ash-Shaja'iyya
15-19	0.021	0.023	0.020
20-24	0.031	0.022	0.040
25-29	0.054	0.040	0.064
30-34	0.074	0.085	0.066
35-39	0.101	0.098	0.103
40-44	0.156	0.141	0.169
45-49	0.136	0.151	0.112

Source: Maternity histories.

Table 8.3 Estimated mortality in infancy and childhood for five-year periods before the survey

Probability of death $1000._xq_n$	Years before survey					
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)
Under-five ($_5q_0$)	-	70	94	115	207	226
Infancy ($_1q_0$)	38	58	78	75	126	139
Neonatal	22	33	28	19	33	50
Post-neonatal	17	25	52	57	95	94
Childhood ($_4q_1$)	-	13	15	43	93	100
Early childhood ($_1q_1$)	3	9	12	25	46	53
Late childhood ($_3q_2$)	-	4	3	15	35	34
Number of births in period	1598	1288	1046	749	542	276

based are also shown.[18] The figures in the table indicate a progressive decline in the overall level of childhood mortality from 226 per thousand in the period 1955-60 to 70 per thousand in the late 1970s. Examination of the mortality rates at young ages does, however, reveal deficiencies in the reporting of vital events which undermine the accuracy of the estimates of the probability of dying before 1975. Compared with the estimated neonatal mortality rate of 33 per thousand live births in 1975-80, the figures for the three preceding periods especially that for the period 1965-70, are impossibly low. These low levels are consistent with the shortfall of neonatal deaths recorded for the periods prior to 1975 (see Section 4.3.2). The effect of both the omission of neonatal deaths and the heaping of deaths on exact age one year is to lower the estimated levels of infant mortality for the earliest periods. Although the rates for 1970-75 and 1965-70 exclude births to women over 40 and 35 respectively, and a high proportion of early infant deaths are usually experienced by women in their advanced ages, the neonatal

[18] The two dead children for whom the age at death was not stated are excluded from the calculations.

mortality rates, and hence the infant mortality rates, for both of these periods are undoubtedly underestimated. The rates for the earlier periods should also be slightly higher than those indicated in Table 8.3.

The best estimates of infant mortality levels are derived from the comparison of the results from the application of the direct and indirect methods and the identification of the more reliable figures from each. The most striking feature in Figure 8.1 is that for the late 1970s onwards, there is a remarkable agreement between the estimates calculated by using the two methods. This indicates that the heaping of infant deaths on age twelve months and incorrect reporting of ages of young women has a negligible impact on the estimated mortality rates. Extrapolating backwards, a reasonable estimate for the level of infant mortality in 1973 would be 90 deaths per thousand live births. The level of infant mortality was also calculated directly from the information on births in the three years preceding the survey, a period for which the age at death reporting was reliable (see Section 4.3.2). The estimated infant mortality rate of 26.4 deaths per thousand live births at the end of 1983 is compatible with the indirect estimates for the early 1980s.

As already noted, the estimates of infant mortality for the late 1950s and the 1960s are less reliable. The rates based on both the proportion of children who had died and the more detailed date of birth and age at death data are clearly too low. This is caused by the under-reporting of deaths, and in the case of the direct estimates, by the heaping of deaths on age one year. Also the direct estimates are calculated from a small number of births (542 in 1960-65, for example). Provided that there was no increase in the pace of the decline, then, extrapolating backwards, the infant mortality rate for the study population would have been in the region of 120-140 in 1967 and 150-170 in 1962.

Figure 8.2 shows that there is reasonable concordance between the levels of childhood mortality estimated by the two methods. The estimates derived from the application of both methods are biased by the factors already discussed but those calculated directly from the maternity histories are less affected by the heaping of ages at death on complete years than the infant mortality indices. The probability of dying before age five of 70 per thousand in the late 1970s (Table 8.3) is the best estimate available. Again, however, the rates for the 1970-75 and 1965-70 are biased downwards by the omission of neonatal deaths. Estimates for the levels in earlier years are approximate but a minimum of 175 deaths per thousand in 1967 and about 225 in 1962 seem reasonable. From the late 1970s

Table 8.4 Estimated mortality in infancy and childhood by period and place of residence

Probability of death $1000._xq_n$	Years before survey					
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)
Ash-Shati						
Under-five ($_5q_0$)	-	73	116	93	189	252
Infancy ($_1q_0$)	32	60	102	71	109	170
Neonatal	13	39	32	18	29	58
Post-neonatal	19	21	72	54	82	119
Childhood ($_4q_1$)	-	15	16	24	90	99
Ash-Shaja'iyya						
Under-five ($_5q_0$)	-	67	73	139	231	180
Infancy ($_1q_0$)	43	57	61	79	153	103
Neonatal	30	29	24	20	39	34
Post-neonatal	15	29	37	61	118	71
Childhood ($_4q_1$)	-	11	14	65	93	86

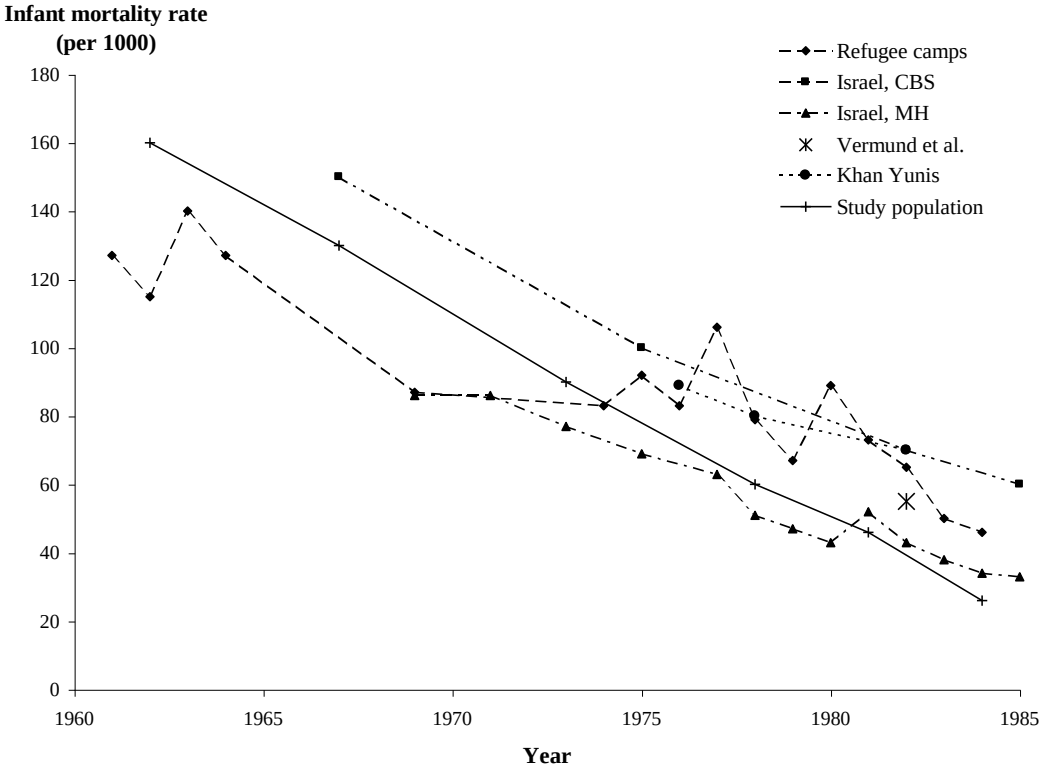


Figure 8.3 Selected series of estimates of infant mortality, Gaza Strip, 1961-85

Sources: Puyet (1979); Abdalla and Guinena (1983); El-Alem (1986); Israel, CBS (1983) and (1987b); Israel, MH (1986); Vermund *et al*. (1985); Dahlan (1987).

onwards, child mortality continued to decline and a plausible estimate for the early 1980s is a probability of dying by age five of 40-45 per thousand.

Estimates of the probabilities of dying at different ages were calculated for each community separately. These figures are presented in Table 8.4 and they highlight the

reporting errors already discussed. Most notably, the estimates based on infant deaths in ash-Shati camp during the late 1960s and in ash-Shajaʻiyya in the late 1950s are implausible low. In the more recent periods, the relative levels of mortality in ash-Shati and ash-Shajaʻiyya fluctuate. Thus the survey data provide no evidence that children in either ash-Shati or ash-Shajaʻiyya were consistently advantaged in survival terms. The interpretation of this finding is that conditions other than easily identifiable community level factors must be the most important determinants underlying the mortality decline in Gaza. In subsequent analyses of the correlates of infant and child mortality, the data for ash-Shati and ash-Shajaʻiyya are combined.

In Figure 8.3 the best estimates from the survey results are compared with other estimates of infant mortality for the Gaza Strip. The results for the study population are consistently lower than most other estimates. In 1967, infant mortality in ash-Shati and ash-Shajaʻiyya was about 13 per cent lower than the ICBS estimate for the total population of the Gaza Strip. In 1975, the difference was of a similar magnitude but by the late 1970s and 1980s, the years for which the survey estimates are most accurate, infant mortality in ash-Shati and ash-Shajaʻiyya was substantially lower than in Buraij camp, the Khan Yunis area, and the ICBS estimate for the Gaza Strip. The results for more recent years are, however, close to the figures based on reported infant deaths for the whole of the Gaza Strip. Although there is little doubt that in the early years of the occupation deaths were underreported, death registration had improved substantially by the 1980s. Given the high degree of internal consistency of the survey estimates for the mid-1970s onwards, and their similarity to reported infant mortality rates for the Gaza Strip, it is concluded that the estimates of infant mortality in the study communities are plausible.

The survey results indicate that mortality at all ages under five was substantially lower than the ICBS estimates of child mortality for the whole of the Gaza Strip. For example, the survey estimates of the probabilities of dying between the first and fifth birthdays of about 50 per thousand in 1967 and around 15 per thousand in the late 1970s contrast with the estimates for the Gaza Strip of 136 in 1967 and 32 per thousand in the early 1980s. Given the large differences between the ICBS and the Ministry of Health estimates of infant mortality, it seems likely that the ICBS figures for both infancy and childhood are too high. The recent Palestinian CBS Demographic Survey results would appear to support this assertion. This survey gives estimates of under-five mortality in the Gaza Strip of 87 in 1975-80 and 57 in 1980-85 (Palestinian CBS, 1997, p.162). These

figures are substantially lower than the ICBS estimates of 150 in 1975, 100 in 1982 and 84 in 1983-87 (Israel, CBS, 1983 and 1987b). The magnitude of the differences between the ash-Shati and ash-Shaja'iyya survey estimates and both the ICBS and the Palestinian CBS figures suggests that the survival chances of children living in ash-Shati and ash-Shaja'iyya are superior to those experienced by the general population of the Gaza Strip. This finding is consistent with the observation (Chapter 5) that, compared with the overall situation in the Gaza Strip, the socio-economic conditions prevailing in the study communities are favourable.

8.2 Changing age patterns of mortality and cause of death

It is evident from the analysis of the results in Section 8.1 that between the late 1950s and early 1980s there was a substantial reduction in child deaths at all ages. The improvement in survival chances was greatest in late childhood (ages three and four), and smallest in the first year, particularly the first month of life.[19] These differential changes indicate a gradual transition in the age pattern of mortality.

The changing age patterns of mortality can be used to draw broad inferences about the causes of mortality decline. For example, in their analysis of trends in child mortality in Jordan during the 25 years leading up to 1976, Blacker *et al.* (1983) established that mortality at ages one to four had fallen even more sharply than infant mortality. Noting that this same trend has been observed elsewhere the writers state, 'Very simply, it seems that early childhood rather than infant mortality is more affected by a reduction in the incidence of the infectious diseases which is usually among the first targets of government health programmes.' (Blacker *et al.*, 1983, p.18). Also, Sullivan (1973) has demonstrated that in countries where gastroenteritis is a leading cause of death, a South mortality pattern with relatively high child compared to infant mortality is most likely to prevail because children are the most susceptible to diarrhoeal diseases.

Table 8.5 Mortality rates for children born in 1955-65 and 1975-85 and corresponding Coale and Demeny model life tables

Age	Rate	Level of mortality

[19] From Table 8.3, rough estimates of the decreases in the probabilities of dying between 1955-60 and 1975-80 are 88, 83 and 73 per cent at ages two to four years, one year and 1-11 months respectively. The figures indicate a 34 per cent reduction in the neonatal mortality rate over the same period.

(x)	$({}_1q_x)$	West		North		East		South	
		Female	Male	Female	Male	Female	Male	Female	Male
1955-65									
0	0.1301	12.16	13.67	10.98	12.60	14.13	15.67	13.09	14.49
1	0.0547	11.54	12.72	10.52	11.86	12.97	14.33	13.03	13.89
2	0.0282	11.25	12.34	10.64	11.85	12.49	13.76	12.95	13.68
3	0.0116	11.36	12.37	11.11	12.20	12.48	13.67	13.06	13.74
4	0.0029	11.64	12.57	11.64	12.63	12.08	13.80	13.26	13.91
1975-85									
0	0.0472	19.33	20.47	19.18	20.26	20.47	21.34	22.33	22.94
1	0.0057	19.52	20.46	19.54	20.39	20.41	21.20	22.31	22.80
2	0.0030	19.57	20.46	19.78	20.57	20.36	21.13	22.29	22.75
3	0.0018	19.61	20.48	19.97	20.72	20.35	21.10	22.27	22.73
4	0.0007	19.69	20.55	20.15	20.87	20.38	21.13	22.29	22.75

Sources: Maternity histories and Coale and Demeny (1983).

In Table 8.5 the mortality rates for children born in two ten-year periods, 1955-65 and 1975-85 are compared with the West, North, East and South families of the Coale and Demeny (1983) model life tables. These groups of models represent the four broad patterns of mortality which have been observed in populations for which reliable age at death statistics are available. For the earliest period the Gaza mortality rates for each single year of age correspond very closely to the South female level 13 model life table. The South models incorporate higher mortality at ages one to four than both the West models for high overall levels of mortality (infant mortality above 95 per thousand), and the East models. The level of mortality at ages three and four in the study population was lower than that in the North family of model life tables.

By 1975-85, the pattern of mortality in the study communities closely resembled the West model for males although the number of deaths at age four was slightly lower than in this model. Although the figures in Table 8.5 show that the 1975-85 Gaza pattern is clearly different from the North family, it resembles both the East and the South models for females. The West model represents a sort of 'average' mortality pattern (Newell, 1988, p.138). For this reason (and also because Israeli mortality data are among those used to derive the West family of life tables), the West model is employed for the indirectly estimated measures of childhood mortality that are presented in Section 8.1.

This comparison of the survey results with the four different patterns of mortality confirms that over the period covered by the survey there was a significant shift in the pattern of mortality at young ages. The high mortality at ages one to four relative to infant mortality was gradually replaced by an increasing concentration of child deaths in the

first year of life. The changing pattern of deaths at young ages in Gaza would, it is argued, be consistent with a decrease in mortality from infectious diseases in general, and diarrhoeal-related causes in particular. Although there is no cause of death information for ash-Shati and ash-Shaja'iyya, some support for this thesis can be derived from other data sources on both infectious diseases and cause of death in Gaza and the region. Some of these data have been presented in Chapter 3. General trends only can be inferred from the recorded data because its accuracy is limited by incomplete reporting, variations in diagnoses, and differential grouping of causes.

During the period of Egyptian administration over the Gaza Strip, large numbers of deaths in Egypt were attributed to infectious diseases and the pattern of disease in Gaza was probably broadly similar. In Egypt in 1967, the cause-specific mortality rates for diarrhoea, respiratory infections and tuberculosis were 454, 160 and approximately 12 deaths per 100,000 population respectively (Omran, 1973, pp. 56 and 59). In the period 1950-65, the cause-specific infant mortality rates were gastroenteritis 68, congenital debility and malformation 34, pneumonia and bronchitis 16, measles 1, and other causes 5 deaths per thousand live births (Omran, 1973, p.61).

Tuberculosis was prevalent in the Gaza Strip and in 1956 the UNRWA-administered tuberculosis hospital in Buraij refugee camp opened a children's ward. However, since in 1955-65 child mortality in ash-Shati and ash-Shaja'iyya was lower than in the North model life tables which were derived from populations with a high incidence of tuberculosis, child deaths from this cause were probably relatively few in number. The number of child death from other notifiable causes in this period is also unknown. However, the Egyptian administration and UNRWA's mass immunizations against typhoid and enteric fever and the introduction of smallpox, polio and diphtheria-pertussis-tetanus (DPT) vaccinations in the 1950s (Israel, MH, 1986), must have contributed to the reduction in child deaths between the late 1950s and the late 1960s. In contrast, the first measles vaccination programme was initiated by UNRWA in 1966 (UNRWA, 1983) and the incidence of this disease during the 1950s and 1960s is likely to have been as least as high as in the early years of Israeli rule (Table 8.6). Numerous late infant and child deaths associated with measles presumably occurred. The reported cause of death data for Gaza refugee camp infants in 1961-64 give an indication of the high level of mortality from non-notifiable infectious diseases that prevailed during the period of Egyptian rule. As

Table 8.6 Reported cases of selected infectious diseases (per 100,000 population), Gaza Strip

	1968-69	1970-74	1975-79	1980-84	1985
Polio	15.1	10.1	5.9	0.7	0.0
Diptheria	0.0	0.0	0.4	0.0	0.0
Pertussis	31.1	8.0	3.9	20.7	71.8
Tetanus	10.5	10.6	12.9	3.1	2.1
Measles	430.6	529.4	134.1	96.3	70.8
Typhoid	15.6	10.7	1.6	3.3	2.1
Infectious hepatitis	213.1	224.3	45.8	72.2*	100.9
Cholera	0.0	13.2	0.0	8.3	0.0
Tuberculosis	N/A	42.0+	30.2#	12.9	N/A

* 1980, 1981, 1983, 1984; + 1972-74; # 1975, 1977-79; N/A Not available.
Source: Israel, MH (1986), pp. 133, 135.

Table 8.7 Selected infant mortality rates, Gaza Strip and West Bank

Age at death / cause of death	Deaths per 1000 live births					
	Gaza Strip refugee camps			West Bank refugee camps		
	1961-64	1975-78	1982	1961-64	1975-78	1982
Infancy	128	90	65	127	67	39
Neonatal	40	25	32	38	21	15
Post-neonatal	87	65	33	89	46	24
Gastroenteritis-malnutrition	54	44	17	57	20	7
Respiratory infections	37	24	13	20	20	9
Prematurity and congenital causes	27	16	32	18	13	12
Other causes	9	5	3	33	13	12

	Gaza Strip registered deaths	
	1982	1985
Infancy	43.3	33.3
Neonatal	20.1	14.5
Post-neonatal	23.0	18.8
Diarrhoea	7.0	5.3
Other infectious and parasitic diseases	1.2	0.4
Diseases of nervous system	1.3	1.0
Diseases of respiratory system	11.6	8.5
Diseases of digestive system	0.4	0.8
Congenital anomalies	2.0	2.3
Perinatal causes including prematurity	18.2	12.6
Other causes	1.6	3.1

Sources: Puyet (1979); Abdalla and Guinena (1983); UNRWA (1987); Israel, MH (1986).

the figures in Table 8.7 show, there were twice as many deaths at age 1-11 months as in the first month of life and most of the post-neonatal deaths were attributed to gastroenteritis-malnutrition and respiratory diseases. At age one to four, the relative distribution of deaths associated with water-borne and air-borne infections may have been different but the level of mortality attributed to each was undoubtedly high. Moreover, even though, as Puyet (1979) points out, respiratory diseases such as pneumonia and

broncho-pnuemonia were often the terminal complications of other infectious diseases such as measles, there is sufficient evidence to conclude that both diarrhoea-related causes and respiratory deaths far outnumbered the deaths from notifiable diseases. This, necessarily approximate, breakdown of deaths by cause is consistent with the age pattern of mortality exhibited by the survey population between 1955 and 1965.

Since 1967, the immunisation programme has been expanded to include oral polio vaccine and to extend BCG vaccine, which had been given to school children, to infants (Israel, MH, 1986). Coverage has undoubtedly improved - among children *registered* at UNRWA and government Maternal and Child Health clinics between 80 and 85 per cent of infants received the complete course of inoculations in 1984 (Israel, MH, 1986, p.132). The vaccination completion rates for ash-Shati and ash-Shajaʻiyya (see Chapter 10) are slightly higher and this is consistent with the suggestion that the study communities had relatively good access to health services. After 1967 the (reported) incidence of most notifiable infectious diseases declined (Table 8.6) but 70 child deaths were reported during a measles epidemic in 1981/82 (Israel, MH, 1986, p.134) and the clinic and hospital data indicates that the incidence of pertussis actually increased in the 1980s. However, it seems reasonable to assume that the total number of deaths caused by notifiable diseases, which had already reached a low level in the early 1960s, continued to decline after 1967.

A significant reduction in the number of child deaths from gastroenteritis and respiratory infections accounts for most of the improvement in child survival in the survey populations between the late 1960s and the 1980s. Evidence to support this assertion is provided by a comparison of the age distribution of infant deaths in the survey population (Table 8.3) and the reported deaths in the Gaza Strip camps (Table 8.7). In the Gaza camps in 1961-64, the post-neonatal mortality rate was more than double the neonatal mortality rate but by 1982 there was little difference between the two rates. In the study population in the early 1960s, mortality at ages 1-11 months was nearly three times higher than mortality in the first month of like but by the early 1980s, the neonatal rate was slightly higher than the post-neonatal rate (Table 8.3). Similar, if not greater, declines in deaths from gastroenteritis and respiratory infections would have occurred at ages 1 to 4.

The cause of death data for the Gaza camps indicate that, by the 1980s, more infant deaths were attributed to gastro-intestinal-malnutrition disorders than to respiratory infections. This contrasts with the data for the Gaza Strip which show that respiratory

infections accounted for a larger proportion of infant deaths (Table 8.7). For the study population in the 1980s, the relatively even distribution of deaths at ages 1-35 months throughout the year indicates that the number of deaths associated with respiratory and gastrointestinal diseases are probably similar.

The published data show that by the 1980s the total number of deaths from causes related to prematurity and congenital abnormalities exceeded the number from either respiratory or gastroenteritis infections. The UNRWA figures indicate that 49 per cent of infant deaths in 1982 occurred during the first month of life and the corresponding figure derived from death registration data is 45 per cent for the years 1980-84. The estimated neonatal and post-neonatal mortality rates for ash-Shati and ash-Shajaʻiyya in the period 1980-85 are 22 and 17 deaths per thousand (Table 8.3). Thus there is no doubt that in the study population in the 1980s, the number of deaths associated with endogenous causes in the neonatal period is greater than the number of infant deaths caused by infections, malnutrition and other exogenous factors. This is a radical shift from the pattern of mortality prevailing in the 1950s when approximately 70 per cent of the infants who died were aged between one and twelve months.

8.3 Trends in the sex differential in mortality

Selected life-table probabilities of dying by sex of the child and period of birth for the survey population are shown in Table 8.8. The rates for the late 1970s and early 1980s, the periods for which the data are most reliable, indicate that, in ash-Shati and ash-Shajaʻiyya, girls were more likely to die at all ages up to five than boys but the increased risk for female children was greatest during the second to eleventh month of life. Thus, the evidence suggests that in the Gaza communities, as in other Palestinian populations (Chapter 3), boys receive preferential treatment.

The rates for the earliest periods are erratic. Some of the fluctuations are explained by the small sample sizes for these periods but the effect of the reporting errors identified in Section 8.1 are readily discernible. The very low female neonatal mortality rates for the late 1960s and early 1970s reveal that the omitted dead children were predominantly female. Undoubtedly some mothers whose daughters died shortly after birth did not report either the birth or the death of these infants. In contrast, the sex differentials in neonatal mortality for the earliest two periods are plausible but neonatal deaths of both

Table 8.8 Estimated mortality in infancy and childhood by period and sex of child

Probability of death $1000._xq_n$	Years before survey					
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)
Male						
Under-five ($_5q_0$)	-	59	111	118	192	210
Infancy ($_1q_0$)	34	48	91	81	136	168
Neonatal	21	31	36	29	32	54
Post-neonatal	13	18	58	54	108	120
Childhood ($_4q_1$)	-	11	22	40	65	50
Female						
Under-five ($_5q_0$)	-	81	74	112	223	244
Infancy ($_1q_0$)	42	69	68	68	117	122
Neonatal	23	36	19	8	35	45
Post-neonatal	20	34	50	61	85	81
Childhood ($_4q_1$)	-	14	7	47	119	139

sexes were probably underreported in the early 1960s. The accuracy of the estimates of the probabilities of dying after the first month of life are affected by differential heaping of deaths on age 12 months. For example, 14 per cent of females compared with 9 per cent of males who were born in the earliest two periods were recorded as having died at exact age one year and fewer girls than boys died at age nine, ten and eleven months. A slight underestimation of the female probabilities of dying between the second and eleventh month of life and overestimation of the death rate between ages one and five years is a consequence of such heaping.

Despite the fact that the precision of the earliest estimates are undermined by various types of reporting error, there is sufficient consistency in the results to permit several conclusive statements about sex differentials in mortality to be made. Throughout the period covered by the survey boys were more likely to survive up to their fifth birthday than girls. Children of both sexes have experienced a substantial improvement in their survival chances at later ages and girls in particular have benefited from the reduction in the probability of dying between exact ages one and five years. By the mid-1970s the excess risk to girls was most marked during the post-neonatal period.

The most obvious explanations for the particularly high risks for girls at ages one to four years between 1955 and 1965 are differential nutrition, child care and health-care seeking behaviour. In the face of food shortages young boys may have been provided with a more nutritious diet than young girls, and poorer care would have resulted in more

girls succumbing to the infectious diseases to which children of both sexes were exposed. These possibilities are investigated in Chapter 10.

8.4 Demographic differentials

This section examines mortality differentials by age of mother, birth order, length of the preceding birth interval and survival of the previous child for 2887 births that occurred in the ten-year period prior to the survey. As Section 8.1 shows, reported ages at death in 1975-85 are less subject to heaping than deaths in earlier periods. Moreover, given the substantial fall in mortality during the preceding 30 years and the fact that maternity histories were only collected from women aged 15-49 at the time of interview, the calculation of rates from all the births recorded would obscure important differentials. For example, since a high proportion of first births were experienced in the distant past and the majority of those of parity seven and above were born close to the survey date, the mortality of the former would be overestimated and that of the latter underestimated if the analyses were performed for all births together.

Separate analyses of differentials were carried out for births in ash-Shati and ash-Shajaʻiyya. No significant differences between the results for each community were found. For this reason only the estimates for the total population are shown.

8.4.1 Age of mother at the time of the birth

Estimated infant mortality rates in Gaza by demographic factors and the risks relative to the expected low risk category for different age groups are presented in Table 8.9. The proportion of births in each category and the statistical significance of the observed mortality differentials are also indicated in the table. In Gaza the children of women over 35 face an increased probability of dying in the first month of life of 58 per cent compared with the children of women aged 20-34. The risk for these children is 19 per cent higher in late infancy and 8 per cent higher during the childhood years. In contrast to the experience of children born to teenage mothers in many developing countries, and even compared with the same group in Israel (Table 3.7), the children of teenage mothers in Gaza appear to be relatively advantaged. This finding is discussed in greater detail in Chapters 9 and 10.

Table 8.9 Probabilities of dying during infancy and relative levels of mortality at different ages, by mother's age at birth, birth order, previous birth interval, and survival of preceding child, ash-Shati and ash-Shaja'iyya, 1975-85

	$1000._1q_0$	Relative mortality			% of births	P= *
		$_{1/12}q_0$	$_{11/12}q_{1/12}$	$_4q_1$		
Total	47				100	
Mother's age						0.039
<20	30	77	50	62	14	
20-34	47	100	100	100	71	
35+	66	158	118	108	14	
Birth order						0.129
1	34	71	78	50	16	
2-6	46	100	100	100	57	
7+	59	104	172	86	27	
Previous birth interval +						0.003
<16 months	81	173	211	173	15	
16-23 months	40	81	111	127	32	
24+ months	44	100	100	100	37	
Survival of the last-born child						0.001
Survived #	45	100	100	100	96	
Died	109	280	210	108	4	

* Lee-Desu statistic; + excludes first births; # includes first births.

8.4.2 Birth order

In Gaza the infant mortality estimates for first, second to sixth, and seventh and subsequent births are 34, 45, and 59 per thousand respectively (Table 8.9). However, the mortality differences for birth order are not statistically significant. First-born children in Gaza city are less likely to die between ages one month and five years than births of order two and above. But the survey results show that between 1975 and 1985 first-born children in Gaza were also advantaged in the first month of life. This finding of low mortality for first births is examined in Chapter 9 and Chapter 10. The raised risk for the Gaza births of seven and above is concentrated in the post-neonatal period during which they experience 76 per cent more deaths than those of parities two to six. However, those infants who survive until their first birthday are slightly less likely to die during childhood than the second to sixth order children.

8.4.3 Length of preceding birth interval

The choice of categories for the examination of the effect of preceding birth interval length in Gaza was determined by the short mean interval length and the need to have a reasonable number of births in each group. Thus, 15 per cent of the births were born less than 16 months after the birth of their adjacent older sibling, 32 per cent were preceded

by an interval of 16-23 months, and 37 per cent by a space of at least two years. The mortality indices in Table 8.9 indicate that, among children born during the ten years prior to the Gaza survey, children born after long intervals are slightly less likely to die in late infancy and childhood than children born after medium-length intervals. But in the neonatal period, infants born after long intervals face higher risks of dying. However, infants who are born after a short pregnancy interval are at a greater risk at all ages. The increased risk for children whose birth follows a short interval is greatest during the post-neonatal period. Compared with infants born at least two years after the preceding child, the mortality of those preceded by short intervals is over 70 per cent higher in the neonatal period and during childhood, and twice as high at ages one to eleven months.

8.4.4 Survival of previous child

For the Gaza population the largest mortality differentials observed are between children whose preceding sibling died before age 18 months and children whose earlier sibling survived to at least this age. The increased risk for the former persists throughout the first year of life but is greatest in the neonatal period. The neonatal and post-neonatal mortality rates for infants born after a child who dies are respectively about two-and-a-half and two times the rates for children whose older siblings do not die before age 18 months (Table 8.9). Those children in the high risk group who survive to their first birthday face an increased risk of dying of only 8 per cent at ages one to four.

Since children who follow a sibling who dies are often born after a very short birth interval, the more important determinant of mortality can only be identified by examining the impact of both the survivorship of the previous sibling and the length of the birth interval together. This is done in Chapter 9.

8.5 Socio-economic differentials

8.5.1 Mother's education

In this section only the overall mortality levels and trends for mothers' educational groups are discussed. In Chapter 9 and Chapter 10, potentially confounding socio-economic and reproductive factors are controlled and the mechanisms through which possession of an education result in improved probabilities of survival are discussed in detail.

Direct estimates of infant and child mortality in ash-Shati and ash-Shaja'iyya by mother's level of schooling are shown in Table 8.10. The Gaza results show that

Table 8.10 Estimated mortality in infancy and childhood by period and mother's years of schooling

Probability of death $1000._xq_n$	Years before survey					
	0-4 (1980-85)	5-9 (1975-80)	10-14 (1970-75)	15-19 (1965-70)	20-24 (1960-65)	25-29 (1955-60)
0-5 years of schooling						
Under-five ($_5q_0$)	-	77	95	118	207	231
Infancy ($_1q_0$)	63	68	83	72	124	147
Neonatal	29	38	31	13	31	52
Post-neonatal	34	32	54	60	96	100
Childhood ($_4q_1$)	-	10	13	50	95	99
% of total births in period	(28)	(43)	(62)	(82)	(89)	(95)
6-9 years of schooling						
Under-five ($_5q_0$)	-	63	86	88	213	67
Infancy ($_1q_0$)	24	50	57	70	170	67
Neonatal	14	30	14	35	64	0
Post-neonatal	13	21	43	36	114	67
Childhood ($_4q_1$)	-	13	25	19	51	0
% of total births in period	(40)	(31)	(20)	(15)	(9)	(5)
10+ years of schooling						
Under-five ($_5q_0$)	-	66	104	160	167	-
Infancy ($_1q_0$)	34	51	98	160	83	-
Neonatal	26	30	33	80	0	-
Post-neonatal	9	22	68	87	83	-
Childhood ($_4q_1$)	-	16	6	0	91	-
% of total births in period	(32)	(26)	(18)	(3)	(2)	(0)

education does confer some advantage after the first month of life. However, the identification of overall patterns is complicated by the small number of older women who had completed primary school and differential omissions and misreporting of ages at death. In the late 1970s and early 1980s the children of women who had received less than six years of schooling were more likely to die than the infants of more educated women. The excess risk is largely concentrated in the post-neonatal period. The figures in Table 8.10 show that the offspring of the least educated mothers experienced the smallest probabilities of dying during childhood in the late 1970s. However, as a total of only 16 children died between ages one and four years in the period 1975-80, limited weight should be attached to the reported differentials for this age range.

The most surprising finding is that children in ash-Shati and ash-Shaja'iyya would not appear to reap any additional benefit if their mothers had remained in school beyond the preparatory level. Moreover, the estimates for the periods 1980-85 and 1975-80, unlike

those for the earlier periods, cannot be dismissed on account of small sample size or reporting errors. The only possible explanation for this unusual result is that any additional skills that women acquire by attending UNRWA or government secondary schools in Gaza are insufficient to counteract conditions prevailing in the two communities which are positively associated with child mortality.

8.5.2 Other socio-economic differentials

In most developing and developed countries there is a strong inverse relationship between mortality and socio-economic status, as defined by husband's education or occupation, number of rooms in the household or possession of consumer durables. The impact of improved socio-economic status is generally observed to be greater after the first month of life (see, for example, Davanzo *et al*., 1983). The smaller effect of such factors on mortality in the neonatal period is explained by the fact that during the first month of life the infant is closer to the mother, more likely to be breastfed, and relatively protected from the vicissitudes of its external surroundings. As the child grows, so will exposure to inadequate, unsuitable or unhygienically prepared foods, contact with older siblings and any infections they may be carrying, and the numerous other hazards of an unhealthy environment. The transition may be gradual or abrupt.

Mortality indices and socio-economic indicators for the study population are presented in Table 8.11. The socio-economic variables include the education and occupation of the mother's current husband, housing density, method of sewage disposal and two composite measures, housing quality and wealth. A superior housing structure is defined as a building with at least two of the following: tiled floors, walls constructed from reinforced concrete blocks, and a roof made of cement. Inferior structures comprise two or all of non-reinforced cement walls, cement or earth floors and an asbestos or zinc roof. The wealth index is a composite measure of ownership of durable consumer goods and land. Households are categorised into four groups: those which did not have a separate kitchen and gas for cooking and a refrigerator, those with these three commodities, those with a solar water heater in addition to the three basic items, and households with one or more 'luxury' items, - a telephone, a car (not used for income generation), or land other than the plot on which the family home was built. The choice of the first three categories derives partly from conversations with women in the two communities. There was general agreement that cooking gas, a refrigerator and a kitchen were essential household facilities and a solar water heater was only slightly less

Table 8.11 Probabilities of dying during infancy and relative levels of mortality at different ages, by selected socio-economic characteristics, ash-Shati and ash-Shaja'iyya, 1975-85

	$1000._1q_0$	Relative mortality			% of births	P= *
		$_{1/12}q_0$	$_{11/12}q_{1/12}$	$_4q_1$		
Husband's years of schooling						0.074
0-5 years	50	149	132	53	28	
6-9 years	48	145	125	83	39	
10+ years	36	100	100	100	29	
Husband's occupation						0.015
Unskilled	52	179	141	116	59	
Skilled	33	100	100	100	37	
Absent	102	218	442	0	4	
Household commodities						0.059
<3 basic	61	104	303	67	21	
3 basic	59	188	127	209	18	
3 basic + solar water heater	42	92	170	83	43	
3 basic + solar + 'luxury'	35	100	100	100	19	
Housing density						0.733
4+ persons per room	49	74	159	137	37	
<4 persons per room	47	100	100	100	63	
Housing quality						0.652
Inferior	49	116	91	109	57	
Superior	46	100	100	100	43	
Household excreta disposal (ash-Shati only)						0.563
Open sewer	31	25	74	200	5	
Septic pit	43	97	52	90	30	
Closed sewer	58	100	100	100	10	

* Lee-Desu statistic.

desirable. Acquiring a water heater involves greater capital outlay than even a relatively new refrigerator as in many households strengthening the roof to support the water tank and solar panels is necessary. The 'luxury' items included are more direct indicators of access to capital. The possession of commodities can be taken as a rough index of the relative wealth of the household at the time of the survey. For households in which there is more than one earner and income is pooled, it is probably a better indicator of the resources available than the occupation of the mother's current husband at the time of interview.

The infant mortality estimates in Table 8.11 indicate that improved socio-economic status is associated with better survival chances for children in the Gazan communities. Mortality rates for the first year of life are 50, 48 and 36 per thousand for children whose fathers had received less than 5, 6-9 and more than 9 years of schooling respectively. As the relative risks show, neonatal and post-neonatal mortality decrease as husband's education increases; the rates for the infants of highly educated husbands are between

two-thirds and three-quarters of the rates for the minimally educated group. However, mortality at ages one to four would appear to increase with additional years of schooling. The children of fathers in the skilled occupation group are more likely to survive infancy but the children in this group are less likely to die at ages one to four. The increased risk associated with low occupation status is larger in the neonatal period than in late infancy, a finding that is contrary to that expected. Ninety-nine ever-married women aged 15 to 49 did not have a husband present in the household at the time of the survey. Two-thirds of these women (69) were widowed. divorced or separated and most of the husbands of the others were working abroad. The sons and daughters of women whose husbands are absent face very high risks of dying during infancy particularly during the post-neonatal period. The impact of paternal factors on child survival is discussed in greater detail in Chapter 9 when potentially confounding variables are controlled.

Wealth - as indicated by its proxy, household commodities - has no consistent impact on neonatal mortality. In addition, the measures of post-neonatal and childhood mortality are somewhat erratic. However, when deaths in these two age groups are combined, the expected pattern is observed. Children who live in the poorest households are almost twice as likely to die between 2 and 60 months as those in the wealthiest households, with a progressive decrease in risk from the former to the latter.

In the post-neonatal and childhood age groups children who live in households which comprise less than four persons per room experience lower probabilities of dying than children who live in more crowded households. In late infancy, the reduced risk for children in low density households is 63 per cent, in childhood it is 73 per cent. Living in a less crowded environment would thus appear to increase the children's probability of surviving and to be more important in late infancy than childhood. Although the differences in the probabilities of dying by housing density are not statistically significant, the findings do indicate that either because of the increased risk of contracting infections, or as a consequence of greater competition for limited resources, children living in over-crowded households are more likely to die. On the other hand, mortality differentials by housing quality in the Gazan communities are small.

Since almost all the houses in ash-Shaja'iyya are connected to a centralised sewage system, mortality differentials by method of excreta disposal are presented for the refugee camp only. The results show that in the second to fifth years of life, when young children are mobile, those who live in households connected to open drains are twice as likely to die as children in households where waste water is directed into closed sewage pipes or

underground pits. The relationship between sanitation and mortality at earlier ages is inconsistent and the results for the sanitation variable, like those for housing density and quality, are not statistically significant.

8.6 Summary

The principal aim of the analysis presented in this chapter is to derive accurate estimates of recent levels and trends in infant and child mortality in ash-Shati and ash-Shaja'iyya and to examine them by key demographic and socio-economic variables.

The Gaza data, like the data collected in most developing country surveys, are not free from reporting errors. But reliable results are easily identified. This is achieved by careful testing for internal consistency and the application of both direct and indirect methods of estimating mortality.

The investigation demonstrates clearly that mortality at young ages declined dramatically over the thirty year period ending in 1985. The mortality transition that began before 1948 continued during the Egyptian administration of the Gaza Strip. By 1967 mortality at ages one to four ($_4q_1$) had fallen to 52 per thousand and considerable progress had been made in bringing preventable infectious diseases under control. This trend continued after 1967. By the late 1970s, the probability of dying between ages one and four had fallen to 13 per thousand. The level of infant deaths fell from about 160 per thousand in 1962 to 90 in 1973 and 38 in the period mid-1980 to mid-1985.

Section 8.1 shows that mortality in the two neighbourhoods of Gaza city began to fall earlier, and by the 1980s had reached a lower level, than that in the Gaza Strip as a whole, the Khan Yunis area or Buraij refugee camp. This finding is not surprising, since owing to their location in the largest urban centre, the survey populations were advantaged in terms of both employment opportunities and access to health care compared with residents living elsewhere in the Gaza Strip. In the years 1980-85 the probabilities of dying during infancy and at ages one to four years in Israel were 14 and 2 per thousand (UN, 1988, pp.40, 46). Thus, despite the improvements in child survivorship in ash-Shati and ash-Shaja'iyya, after 16 years of occupation the levels of infant and child mortality even in these relatively better-off Gazan communities were at least double those prevailing among Palestinians in Israel.

The change in the levels of mortality was largely the consequence of a reduction in the number of deaths from both preventable infectious diseases and gastrointestinal and

respiratory infections. In the years 1982-85, 53 per cent deaths below age three occurred in the first month of life, a finding which suggests that congenital abnormalities, prematurity and birth trauma together have replaced infectious diseases as the leading cause of child deaths in ash-Shati and ash-Shaja'iyya.

The estimated mortality rates for the two communities in Gaza during the period 1975-1985 also reveal plausible variations in mortality levels for both demographic and socio-economic variables. Three groups of children are at particular risk during the first month of life because of their weak constitution at birth. These are infants who are born within 15 months of an earlier child, those who follow a sibling who died at an early age and children born to women over the age of 34. Compared with parities two to six, seventh and higher order births face a negligible increase in neonatal mortality but an excess mortality risk of 72 per cent at ages 1-11 months. Family formation factors must explain the high post-neonatal mortality experienced by this group of children. The vast majority (92 per cent) of the children born to mothers aged 35+ are of order seven and above. It seems very likely that the cause of the high levels of post-neonatal and child mortality among the children in this group is also either competition from other siblings for limited resources or greater exposure to infection. Children who follow short birth intervals and those who are born after a sibling who dies also face reduced survival chances between the ages of one month and five years. Whether the excess mortality risks are attributable to biological factors, behavioural factors or both broad groups of causes cannot be determined from the data presented in this chapter. A further attempt to account for these findings using multi-variate analyses is made in Chapter 9.

No consistent relationship between socio-economic status and neonatal mortality exists in Gaza. But the anticipated greater relative impact of socio-economic factors on mortality after the first month of life is only partially substantiated by the results. There is a gradient in the expected direction for post-neonatal mortality for all measures of socio-economic status except housing quality and sanitation. Also when deaths at ages 2-59 months are combined, a gradual improvement in the survival chances of children is observed as the wealth of the household increases and housing density diminishes. In general, the evidence indicates that between 1975 and 1985 the influence of husband's occupation and household wealth on child mortality in ash-Shati and ash-Shaja'iyya was greater than the effect of husband's education and housing quality, sanitation and density.

CHAPTER 9

CORRELATES OF MORTALITY

9.1 Introduction

The examination of mortality differentials in the preceding chapter ignores possible confounding between the variables investigated. For example, a seventh child may be at risk because it follows closely after the sixth, or as a result of its mother's advanced age, or because of both effects acting together. Regression-based analyses can be employed to identify the most important demographic and socio-economic factors after adjusting for the other variables. This is the first objective of this chapter. The second objective is to assess the effect of the significant socio-economic variables net of the demographic factors. In Chapter 3 it is argued that demographic variables exert their effect on mortality through different pathways. The health of the mother may affect the infant's physical constitution at birth. Alternatively, or additionally, reproductive patterns, namely the number, timing and spacing of births, may have a negative impact on survival at older ages, either because of increased exposure to infections or as a consequence of competition for limited resources. Changes in the risks associated with the socio-economic variables after demographic factors have been controlled will indicate the extent to which the impact of the former is transmitted through a change in demographic factors. Any net effect of socio-economic variables will suggest that improved socio-economic status is associated with, for example, greater availability of nutritious food, better access to appropriate medical attention in the event of sickness, or the adoption of child care practices which enhance infant survival.

In this chapter the correlates of mortality for all births recorded in the maternity histories are investigated. A summary of the methods employed is given in Section 4.2.2. Three sets of analyses were performed. These are described in section 9.2. The first group of models includes demographic variables, the second socio-economic factors, and the third combines the more important of both types of explanatory variable. This three-stage approach was adopted primarily because it is consistent with the expectation that socio-economic correlates of mortality exert their impact, to a greater or lesser extent, through

the demographic determinants. Finally, in Section 9.3, the interpretation of the empirical results is discussed.

The impact of the following variables is examined: mother's age at the time of the birth, birth order, length of the preceding birth interval, survival of the previous child, mother's education, husband's education and occupation, wealth, housing density and presence of the husband in the household. Since the difference in risks between children born to women who attended school for 6-9 years and 10+ years were never significantly different from each other, in the analyses presented these two subgroups are combined. Similarly, the differences in mortality between children in ash-Shati and those living in ash-Shaja'iyya were not significant so only the total population is considered. For the same reason, the findings for housing quality and household excreta disposal are not discussed. Also, because of the bias introduced by the underestimation of female deaths in the years 1965-1975 (see Section 8.3), no gender variable is included in the models. The pattern of mortality by age and period is shown in Table 8.3. In order to take into account the substantial fall in mortality during the thirty-year period covered by the survey, births were grouped into three cohorts (1975-85, 1965-75, and pre-1965 years). Risks of dying in seven age intervals are examined (less than 1 month, 1-2, 3-5, 6-11, 12-23, 24-59 and 60-119 months).

Each analysis was started by including age at death alone in the model. Independent variables were added one at a time and the P value is used to indicate whether the variable's addition represents an improvement of fit over the more restrictive model (Table 9.1). The risks for each category relative to the baseline group for the variable are given in column I of Table 9.1. Since, as expected, controlling for period of birth represents a highly significant improvement to the model (P=<0.001), the independent variables were also added to a model containing age (*AGE*) and period of birth (*PER*). Thus, examination of columns I and II shows that, whether controlling for age at death only or age at death and period of birth, including the length of the preceding birth interval (*IVL*) significantly improves the fit of the model (P=<0.001 and P=<0.001). After controlling for period, neither the survivorship of the last child (*SLC*), nor mother's age at the time of the birth (*MAG*) results in a better explanation of variations in mortality. Examination of the parameter estimates and their standard errors reveals that the absence of significant differences between the subgroups of each of these two variables is consistent with this result. The third stage (column III) confirms that the simple model *AGE+PER+IVL* is the optimal main effects model. However, the significantly increased

risk experienced by births to older women compared with births to women aged 20-34 suggests that mother's age is not unimportant. At this point, interaction terms were added to the simple main effects model. Thus, for example, the addition of the interaction between mother's age and period of birth (*MAG*PER*) to the *AGE+PER+IVL* model produces a more adequate description of the data (P=<0.025) (Table 9.2).

To summarise, the aim is first to establish the simplest main effects model for each analysis and subsequently to identify those interactions which provide a better description of the data than the main effect terms alone. While the acceptability of a model is determined by statistical criteria, other interesting results are also discussed in the presentation.

9.2 Results

9.2.1 Demographic model

The demographic factor with the biggest differential impact is the length of the preceding birth interval. After controlling for period of birth, the relative risk of dying for children who are born less than 16 months after their nearest sibling is 1.88 and that of those who follow intervals of at least two years 0.72 compared with first births (Table 9.1, column II). The risk to children born after short intervals is over two-and-a-half times that of those preceded by long intervals. The figures in Table 9.1 demonstrate that, when all the births are considered, there is a progressive decrease in the risk of dying as interval length increases. The results from the life table analysis (Section 8.4) show that for children born within ten years of the survey the differences in the probabilities of dying between those who follow medium and long birth intervals are smaller. It is evident that in the distant past, children born at least two years after the preceding birth were at a substantial advantage over those born within 16-23 months of an earlier child. There is no significant interaction between birth interval and age at death (not shown). This indicates that the elevated risks associated with short birth intervals persist throughout infancy and childhood and are not concentrated in any particular age group.

The death of the preceding sibling increases the probability of dying for the index child by 60 per cent. Controlling for period of birth and for period and preceding birth interval reduces the increase in risk to the index child to 29 per cent and 3 per cent (Table 9.1, columns I, II and III). These results indicate that throughout the period covered by

Table 9.1 Estimated relative risks of dying by demographic characteristics, controlling for age at death, age at death and period of birth, and age at death, period of birth and length of previous birth interval

Independent variable	Other variables in the model		
	I *Age at death*	*II* *Age at death* *+ period of birth*	*III* *Age at death* *+ period of birth* *+ previous birth interval*
Survival of the last-born child	(P=<0.025)	(ns)	(ns)
Survived	1.00	1.00	1.00
Died	**1.60**	1.29	1.03
Mother's age	(P=<0.005)	(ns)	(ns)
<20	1.00	1.00	1.00
20-34	**0.70**	0.90]	0.94
35+	**0.61**	1.10]	1.34
Previous birth interval	(P=<0.001)	(P=<0.001)	-
First births	1.00	1.00	-
<16 months	**1.68**	**1.88**	-
16-23 months	**0.76**]	0.92	-
24+ months	**0.62**]	**0.72**	-
Birth order	(ns)	(ns)	-
1	1.00	1.00	-
2-6	0.97]	1.06]	-
7+	0.81]	1.16]	-
Previous birth interval and birth order	-	(P=<0.001)	-
First births	-	1.00	-
<16 months, order 7+	-	**1.87**]	-
<16 months, order 2-6	-	**1.90**]	-
16-23 months, order 7+	-	[**1.04**	-
16-23 months, order 2-6	-	[0.89	-
24+ months, order 7+	-	[0.89]	-
24+ months, order 2-6	-	**0.67**]	-

Notes:

1. P value indicates significance of improvement of fit over the more restrictive model identified in the column heading; ns, not significant at the 5 per cent level.
2. Risks in bold type are significantly different from the baseline group.
3. Bracketed risks are not significantly different from each other.

the survey the death of a previous child is associated with higher mortality of the index child. But the increased probability of dying is largely attributable to the risks associated with the short birth intervals which succeed premature deaths. (The possibility that an early conception following one birth is more likely to result in a premature, and therefore high risk, second birth cannot be ruled out.) Thus it is evident that in ash-Shati and ash-Shaja'iyya when one infant dies the subsequent child does not face an increased probability of dying unless the mother has insufficient time to recuperate between the two pregnancies. Children who succeed a sibling who dies face very high risks of dying in the post-neonatal, as well as the neonatal, period (see Section 8.4). It seems likely that the excess mortality risks throughout infancy and even the slightly lower chances of survival

at ages one to four years are a consequence of the inferior physical constitution at birth of these children.

As the figures in Table 9.1 show, the addition of the parity variable to the *AGE* model or the *AGE+PER* model does not improve the fit of either model. Nor are any of the risks for the sub-groups significantly different from each other.[20] The results for parity are consistent with the findings in Section 8.4, namely low risks for first births and high risks for births of order seven and above. In order to assess the effect of both birth order and the length of the preceding birth interval, another, combined variable (*IVP*), was created. The results for parity and birth interval combined show that the risks for all children born at the end of short intervals are rather similar. The substantial increased risk attributable to a short preceding birth interval clearly predominates over any advantage gained from being in a low risk birth order group. Following medium and long intervals the very high order births are more likely to die than parities two to six. However, none of the differences in risks between the medium and high order births are statistically significant. The reason for the low risk experienced by first births is clarified by the results for the combined parity and interval variable. First-born children face higher chances of dying than children born after long birth intervals, slightly higher risks than those who follow medium-length intervals, and substantially lower probabilities of dying than infants born within 15 months of the preceding child. Thus, if the very high risk short birth intervals are excluded, the risk for first births is higher than the risks for parities two to six and seven and above.

As in the case of parity, the bias of the sample is responsible for the decreasing risk associated with increasing mother's age that is indicated when age at death is the only other variable in the model. Once period has been added, the expected U-shape of low risk for births to women in their prime fertile ages and higher mortality among children born to younger and older mothers is evident. The addition of mother's age to the *AGE+PER* and *AGE+PER+IVL* models did not produce a significant improvement in fit but an important finding is demonstrated by a comparison of the risks associated with

[20] The monotonic relationship of decreasing risks of dying with increasing parity when age at death is the only other variable included in the model is explained by the fact that a high proportion of first births were experienced in the distant past when mortality levels were high, and most of the very high order births recorded occurred recently when the overall risk of dying had fallen substantially. After controlling for period of birth, the risks increase slightly, but not significantly, with increasing birth order.

mother's age in these two models (Table 9.1, columns II and III). After controlling for the length of the preceding birth interval, the risk to children born to women in their prime fertile ages increases slightly and the elevated risk experienced by the children of older women rises by 22 per cent (from 1.10 to 1.34). This change is explained by the fact that more of the births of mothers aged 20-34 are preceded by short intervals, while the children of older women are more likely to follow lower risk, medium or long intervals. Clearly the reason children of older mothers are at risk is not because they tend to follow shortly after the previous child. Indeed, the probability of dying for this group would be even higher if it were not for the fact that they are preceded by longer than average birth intervals.

The results from the analysis summarised in Table 9.1 demonstrate that the optimal main effects model is that which includes only three variables: age at death, period of birth, and the length of the preceding birth interval. A more adequate representation of the data is achieved by adding the interaction of mother's age and period of birth (*MAG*PER*) to the simple main effects model (P=<0.025). As Table 9.2 shows, three of the interaction terms are significant, as are the differences in risks between the baseline groups and older women and the periods 0-9 and 10-19 years prior to the survey. This model shows why the inclusion of the mother's age main effect term alone fails to improve the fit the data better, - the risk associated with mother's age at the time of the birth has changed over the past 30 years. The fall in mortality has been greatest for young mothers. Compared with the mortality of children born to women under 20 in the years prior to 1965, the risk to children born by women in the same age group fell to 53 per cent between 1965 and 1975 and a low of 14 per cent in the most recent ten-year period (Table 9.2). Prior to the most recent period, the lowest risks of dying were experienced by the offspring of women aged 20-34 but the relative improvement for these births has been smaller, by 1975-85 the risk had been reduced to 30 per cent of the 1955-65 level.[21] Obviously the risks experienced by children born to older women in the distant past cannot be ascertained from the reporting of women aged 15-49 at the time of the survey. The figures for this age group in the two most recent periods indicate that the relative improvement in survival chances among children born to older women has been smaller than for younger women. However, the improvement for children born to older women

[21] Because of the nature of the sample, in the period up to 1965 all the births in the 20-34 age group are born to women aged 20-29.

Table 9.2 Estimated relative risks of dying by mother's age and period of birth, controlling for age at death and length of previous birth interval

Mother's age	*Period of birth*		
	1975-85	**1965-75**	Pre-1965
<20	0.14	0.53	1.00
20-34	**0.25**	0.40	0.84
35+	**0.38**	0.44	-

Notes:

1. This model, AGE+PER+IVL+MAG+MAG*PER, represents a significant improvement in fit over the more restrictive model, AGE+PER+IVL, P=<0.025.
2. Main effects with column or row labels in bold type are significantly different from the baseline group.
3. Interaction terms in bold type are significantly different from the baseline group.

is underestimated since the risks for this group in 1965-1975 represent only the mortality experience of children born to women aged 35-39 (and not the highest risk 40-49 age group).[22]

Comparison of the risks associated with birth interval length between the main effects model (Table 9.1, column II) and the one including *MAG*PER* (Table 9.3) indicates that the impact of birth interval is independent of the effect of the age of mother at the time of the birth (negligible changes in the risks for IVL). In contrast, there is evidence of confounding between maternal age and parity. The increased risk to births above order six compared with those of order two to six after medium and long intervals is reduced after the addition of the interaction term *MAG*PER* to the *AGE+PER+IVP* model (compare Table 9.1, column II and Table 9.3). Overall the results for parity demonstrate that, except when they follow very short intervals, high order births are more likely to die than the second to sixth births. About half of the increased risk is attributable to the advanced age of mothers of very high order births. However, unlike the difference in risks between births to women aged 20-34 and 35+, the differences in risks between parities two to six and seven and above are never statistically significant.

The importance of changes in the age pattern of mortality over time is indicated by the highly significant improvement in fit obtained by adding the interaction *AGE*PER* to the *AGE+PER+IVL* model (Table 9.4). Relative to the baseline of neonatal mortality in

[22] To identify the cause of the higher risks among children of teenage mothers in the distant past, the interaction of mother's age and child's age at death (in the model *AGE+PER+IVL+MAG+MAG*AGE +MAG*PER*) was examined (not shown). The results revealed that the children of the youngest mothers were more likely to die at most ages in childhood, but found no evidence that their excess risk was either attenuated or increased with increasing age of the child.

Table 9.3 Estimated relative risks of dying by length of previous birth interval and birth order and birth interval, controlling for age at death and mother's age and period of birth

Independent variable	Other variables in the model *Age at death + period of birth + mother's age + interaction of mother's age and period of birth*
Previous birth interval	(P=<0.025)[4]
First births	1.00
<16 months	**1.89**
16-23 months	0.92]
24+ months	**0.70**]
Previous birth interval and birth order	(ns)[5]
First births	1.00
<16 months, order 7+	**1.79**]
<16 months, order 2-6	**1.92**]
16-23 months, order 7+	[0.99
16-23 months, order 2-6	[0.90
24+ months, order 7+	[0.79]
24+ months, order 2-6	**0.68**]

Notes:

1. P value indicates significance of improvement of fit over the more restrictive model identified in the column heading; ns, not significant at the 5 per cent level.
2. Risks in bold type are significantly different from the baseline group.
3. Bracketed risks are not significantly different from each other.
4. This model, AGE+PER+IVL+MAG+MAG*PER, compared with AGE+PER+IVL.
5. This model, AGE+PER+IVP+MAG+MAG*PER, compared with AGE+PER+IVP.

the period leading up to 1965, mortality at ages over three months declined with both age and progression towards the survey date. The only deviation from this pattern is the slightly higher risk of dying at ages 6-11 months than 3-5 months in the earliest period. This is probably a consequence of heaping on age nine months in this period (see Figure 4.3). The other reporting deficiencies which are highlighted are the understatement of neonatal deaths in the years 1965-75, and the under-reporting of deaths at ages one and two months in all three periods.

The varying impact of mother's age over time remains significant when the changing age pattern of death is taken into account. Models that include both interactions are presented in Section 9.2.3.

9.2.2 Socio-economic model

Columns I and II of Table 9.5 demonstrate clearly that mortality differentials associated with several of the socio-economic variables included in the analysis are confounded by the effect of the timing of births. About half of the reduced probability of dying among children born to highly educated women is explained by the large proportion of these births which took place in years of low prevailing levels of mortality. Even after accounting for the period of birth, however, the children of educated women continue to

Table 9.4 Estimated relative risks of dying by age at death and period of birth, controlling for length of previous birth interval

Age at death – months	*Period of birth*		
	1975-85	**1965-75**	Pre-1965
<1	0.71	0.63	1.00
1-2	0.06	0.10	0.11
3-5	**0.08**	0.19	0.25
6-11	**0.03**	0.11	0.27
12-23	**0.01**	0.04	0.13
24-59	**0.004**	**0.006**	0.03
60-119	0.001	0.001	0.004

Notes:

1. This model, AGE+PER+IVL+AGE*PER, represents a significant improvement in fit over the more restrictive model, AGE+PER+IVL, P=<0.001.
2. Main effects with column or row labels in bold type are significantly different from the baseline group.
3. Interaction terms in bold type are significantly different from the baseline group.

experience significantly lower mortality (relative risk=0.78). In contrast, there are no significant differences in mortality by husband's education after the timing of births has been controlled. The significant advantage of having a father in the skilled occupation category does, however, persist although there is some reduction in it when period of birth has been accounted for. This is explained by the fact that skilled workers tend to be younger and have had their children in the more recent past, when mortality was lower.

The addition of the wealth index, *COM* to the *AGE+PER* model results in a very significant improvement in fit (P=<0.001). The figures indicate that children born in households which, in 1985 when the interviews were conducted, owned at least one 'luxury' item (telephone, car or land other than the household plot) in addition to a solar water heater and the three basic commodities had a reduced risk of dying (0.61) throughout the thirty-year period covered by the survey. This finding vindicates the assumption made in constructing this variable, that households which were wealthy in 1985 were also relatively wealthy in the distant past, even before some of the current commodities were acquired.

In column III of Table 9.5, husband's education and occupation, household commodities, and housing density are added individually to a model in which mother's education, age at death and period of birth have been controlled. The addition of husband's education does not improve the fit of the model. Interestingly, however, the advantage to children of having a father with ten or more years of schooling is reduced when mother's education is controlled (risk relative to the baseline group changes from 0.85 to 0.93). This indicates that many of the highly educated women marry educated

Table 9.5 Estimated relative risks of dying by socio-economic characteristics, controlling for selected other factors

Independent variable	Other variables in model				Model
	I *Age at death*	*II* *Age at death + period of birth*	*III* *Age at death + Period of birth + mother's schooling*	*IV* *Age at death + period of birth + mother's schooling + commodities*	*Age at death + period of birth + mother's schooling + commodities + husband's presence*
Mother's schooling	(P=<0.001)	(P=<0.025)			
0-5 years	1.00	1.00	-	-	1.00
6+ years	**0.51**	**0.78**	-	-	**0.78**
Husband's schooling	(P=<0.001)	(ns)	(ns)	(ns)	
0-5 years	1.00	1.00	1.00	1.00	-
6-9 years	**0.76**]	1.02]	1.07]	1.09]	-
10+ years	**0.59**]	0.85]	0.93]	0.94]	-
Absent	**1.36**	**1.35**	**1.38**	**1.36**	-
Husband's occupation	(P=<0.001)	(P=<0.01)	(P=<0.025)	(ns)	
Unskilled	1.00	1.00	1.00	1.00	-
Skilled	**0.76**	**0.81**	0.84	0.90	-
Absent	**1.50**	**1.28**	1.30	1.30	-
H'hold commodities	(P=<0.01)	(P=<0.001)	(P=<0.001)	-	
<3 basic	1.00	1.00	1.00	-	1.00
3 basic	0.87]	0.89	0.89	-	0.91
3 basic + solar heater	**0.72**]	**0.66**]	**0.66**]	-	**0.67**]
3 + heater + 'luxury'	**0.67**]	**0.61**]	**0.61**]	-	**0.62**]
Housing density	(ns)	(P<0.05)	(P<0.05)	(ns)	
4+ persons per room	1.00	1.00	1.00	1.00	-
<4 persons per room	0.96	**0.82**	**0.83**	0.90	-
Husband	(P<0.001)	(P<0.005)	(P<0.05)	(P<0.05)	
Present	1.00	1.00	1.00	1.00	1.00
Absent	**1.65**	**1.37**	**1.37**	**1.34**	**1.34**

Notes:

1. P value indicates significance of improvement of fit over the more restrictive model identified in the column heading; ns, not significant at the 5 per cent level.
2. Risks in bold type are significantly different from the baseline group.
3. Bracketed risks are not significantly different from each other.

men. Moreover, the absence of any interaction between mother's and husband's education (not shown) reinforces the conclusion that husband's education *per se* has no direct impact on child mortality. If, however, a husband is located in the skilled occupation category, his offspring experience lower risks of dying than those of unskilled workers irrespective of educational level. When the effect of husband's occupation has been accounted for, the advantage to children of having an educated mother is reduced slightly (relative risk changes from 0.78 to 0.81) probably because there is some tendency for men in the superior occupational group to marry educated women.

There is no change in the risks associated with either mother's education or wealth when the other variable is controlled. The interpretation of this result is that both

increased education of women and increased wealth - as measured by its proxy, household commodities - exert independent positive effects on child survival. The reduced risk associated with living in households where there are less than four persons per room is also independent of the mother's education effect. It is therefore inferred that maternal education cannot mitigate the disadvantages associated with living in an over-crowded household. However, once the number of household commodities has been controlled, housing density is no longer significant (Table 9.5, columns III and IV). The two factors are clearly associated, - wealthy households live in dwellings with a large number of rooms. This result shows that at least part of the explanation for higher child mortality in underprivileged households might be greater exposure to respiratory diseases and other infections which are transmitted rapidly in an over-crowded environment.

The advantage associated with husbands engaged in skilled work diminishes, and is no longer significant, after relative wealth is accounted for. Again, an association between increased income derived from more highly paid skilled work and improved household facilities is to be expected. The stronger association between household wealth and child survival than husband's occupation and child survival is evidence that the presence of household commodities reflect more accurately the income in a household over an extended period of time. Such an interpretation would be consistent with an important role for remittances from abroad sent by sons or brothers who were not enumerated in the household.

At each stage in the socio-economic analysis, the mortality risks of children born to women whose husbands were absent at the time of the survey are significantly higher than those of at least one other group, whether the occupation or education of the husband is the variable under consideration. A new variable, presence or absence of husband, *ABS*, was therefore created. Its addition remains significant even after the impact of mother's education and household commodities have been accounted for (Table 9.5, column IV). Thus, children of absent fathers are about 35 per cent more likely to die than children whose fathers were present in the household at the time of the survey. The absence of any change in the risks for mother's education and wealth of the household after the presence of the husband has been controlled indicates that the higher mortality is not a direct consequence of either poverty or the inferior childrearing skills of the mother. As noted earlier, two-thirds of the women with absent husbands were widowed, divorced or separated and most of the husbands of the remainder were working abroad. The children of absent fathers live in three types of households, - lone parent nuclear households and

Table 9.6 Estimated relative risks of dying by age at death and mother's years of schooling, controlling for period of birth, household commodities, and husband's presence

Age at death – months	*Mother's years of schooling*	
	6+	0-5
<1	1.26	1.00
1-2	0.11	0.14
3-5	0.23	0.22
6-11	**0.07**	0.18
12-23	0.04	0.06
24-59	**0.008**	0.02
60-119	0.002	0.003

Notes:

1. This model, AGE+PER+MED+COM+ABS+MED*AGE, represents a significant improvement in fit over the more restrictive model, AGE+PER+MED+COM+ABS, P=<0.05.
2. Main effects with column or row labels in bold type are significantly different from the baseline group.
3. Interaction terms in bold type are significantly different from the baseline group.

extended households comprising either their father's or their mother's kin. Although there is no difference in the overall mortality of children living in nuclear and extended households at the time of the survey (not shown), children of absent fathers may face poorer survival chances in both types of households. Divorced women and widowed mothers of young children have particularly low status in Arab society (see, for example, Youssef, 1978). Economically-inactive, divorced mothers who are compelled to return to their father's or brother's home are dependent on these relatives and have limited access to, and control over, financial resources. Similarly, a reduction in the authority of the mother when she is living in her mother-in-law's house may have adverse consequences for young children.[23] Thirteen per cent of widowed and divorced women are engaged in income-generating work compared with only two per cent of currently married women. The infants of mothers who are obliged to work are looked after by other family members including older children. The offspring of absent fathers face particularly elevated risks of death during late infancy and childhood (Section 8.5). It therefore seems likely that the children suffer because of the inadequate care which they receive. This in turn is a consequence of the low status of lone mothers. Since the low status of women derives

[23] One ash-Shaja'iyya woman, for example, refused to allow her daughter-in-law to take her four-year old son to a clinic when he was badly scalded by boiling water from a kettle. Rather, the older woman insisted on covering the injury with toothpaste, which is commonly used as a soothing/cooling cream. Three days later the boy's father returned from his work in Israel and persuaded his mother to allow the boy to be taken to the clinic as the injury was still proving troublesome.

from their poor income-generating potential, it is obvious that poverty is the remote determinant of the high mortality of the sons and daughters of lone mothers even if the households in which they reside are not especially disadvantaged.

Table 9.6 shows the effect of one interaction, that between education and age at death, which, when added to the optimal main effects model *AGE+PER+MED+COM+ABS*, provides a more adequate description of the data. The higher risk for infants of highly educated women in the first month of life is a result of the greater omission of neonatal deaths by poorly educated women. Although the trends in the risks by age group are affected by differential heaping on particular ages at death, it is clear that, over the thirty-year period as a whole, the impact of maternal education has been greatest during late infancy and early childhood. At ages 1-2 months the relative risk of dying in the more educated group is 0.79, at ages 6-11 months only 0.39, and in the older age groups between 0.40 and 0.67. In Gaza, no interaction exists between the wealth of the household and children's age at death and, as already noted, maternal education and wealth are important for child survival for different reasons. The paths through which these two socio-economic status measures operate to reduce child mortality are explored in Section 9.2.3.

9.2.3 Combined model

In the final stage of the analysis of the correlates of mortality for all births recorded, mother's education, the possession of household commodities, the presence of the husband, and the significant interactions identified are added to a model containing age at death, period of birth and length of the preceding birth interval. Two of the main effect terms, maternal education and wealth, the interactions of age at death and timing of birth, and the change in the risks associated with mother's age over time, result in an improvement in fit compared with the more restrictive model. (The P values at each stage were: *+MED*, P=<0.005; *+COM*, P=<0.001; *+AGE*PER*, P=<0.001 and *+MAG +MAG*PER*, P=<0.05.)

The difference between the two models *AGE+PER+IVL* and *AGE+PER+IVL+ABS* is not statistically significant. Also, the elevated mortality risk (1.32) experienced by children in families where the husband is not present is significant at the 10 per cent, but not the 5 per cent, level once the strong relationship between mortality and preceding birth interval is controlled. The changes in the risks associated with period of birth and length of birth interval (not shown) explain this result,- births in families where the

Table 9.7 Estimated relative risks of dying by selected demographic and socio-economic characteristics, controlling for age at death and period of birth

Independent variable	Other variables in model *Age at death + period of birth +*		
		Mother's years of schooling	*Household commodities*
Previous birth interval			
First births	1.00	1.00	1.00
<16 months	**1.88**	**1.82**	**1.89**
16-23 months	0.92	0.87	0.93
24+ months	**0.72**	**0.66**	**0.73**
Mother's age			
<20	1.00	1.00	1.00
20-34	0.90]	0.88]	0.91]
35+	1.10]	0.98]	1.15]
		Length of previous birth interval	*Mother's age*
Mother's years of schooling			
0-5 years	1.00	1.00	1.00
6+ years	**0.78**	**0.70**	**0.79**
Household commodities			
<3 basic	1.00	1.00	1.00
3 basic	0.89	0.86	0.89
3 basic + solar water heater	**0.66**]	**0.66**]	**0.66**]
3 basic + solar + 'luxury'	**0.61**]	**0.61**]	**0.61**]

Notes:
1. Risks in bold type are significantly different from the baseline group.
2. Bracketed risks are not significantly different from each other.

husband is absent are concentrated in the distant past and are more likely to follow (low risk) long or medium-length birth intervals.

Including the interaction of maternal education and age at death does not add to the descriptive power of the model once the highly significant interaction of age at death and period of birth has been incorporated. This is explained by confounding between the two sets of effects,- the impact of a high level of maternal education on the probability of dying at later ages in childhood was greater in the more distant than in the recent past. Clearly other factors in addition to women's school attendance have contributed towards the differential rates of decline in mortality.

The extent to which the significant socio-economic correlates exert their impact via the proximate demographic determinants is most clearly demonstrated by adding one of each type of the variables to a model in which age at death and period of birth are controlled. The results in Table 9.7 are simply summarised:

A. Mother's education and mother's age

Predictably, there is considerable confounding between mother's age and education: the oldest women are the least educated and the teenage mothers are most likely to have attended school for six years or longer. Compared with births to highly educated women, children born to less-educated mothers experience reduced survival chances of about 21 per cent (when mother's age is controlled the relative risk for the 6+ education group is 0.79). But, in addition, the excess risk for the 35+ age group compared with the 20-34 age group, is halved when the effect of mother's education is taken into account (the risks for the 20-34 and 35+ age groups change from 0.90 and 1.10 to 0.88 and 0.98).

B. Mother's education and preceding birth interval

Regardless of the length of the preceding birth interval, all offspring of educated mothers face risks of dying which are about 30 per cent lower than those experienced by children born to uneducated mothers. The fact that the relative risk for births to educated women changes from 0.78 to 0.70 when the length of the birth interval is controlled shows that there is a negative relationship between the number of years of formal schooling and birth spacing. If the average length of the intervals between births among educated mothers was increased to that prevailing among their less-educated counterparts, the advantage to children of educated mothers would increase. A similar result is demonstrated for mother's age and birth interval,- births to older women are preceded by longer intervals (see Section 9.2.1). There is little difference in the mortality risks associated with the length of the preceding birth interval before and after adjusting for mother's education. Thus, unlike the risks associated with advanced age of the mother, the elevated mortality risks for short compared with longer birth intervals are not reduced for the children of educated mothers.

C. Household commodities and mother's age

The only change in the risks for the maternal age and wealth categories when the other variable is controlled is a slight increase in the risks for the 35+ age group. This signifies that, on average, older women live in slightly more affluent households. In general, however, the children of mothers of all ages enjoy increased survival chances of almost 40 per cent if they are born in wealthy rather than the poorest households.

D. Household commodities and preceding birth interval

It is clear from the lack of change in the relative risks that the wealth of the household and the length of the preceding birth interval have independent effects on children's survival

Table 9.8 Estimated relative risks of dying, all births, optimal model

Household commodities		*Previous birth interval*	
<3 basic	1.00	First births	1.00
3 basic	0.88	<16 months	**1.86**
3 basic + solar water heater	**0.67**	16-23 months	0.89
3 basic + solar + 'luxury'	**0.61**	24+ months	**0.67**
Mother's years of schooling			
0-5 years	1.00		
6+ years	**0.73**		

	Period of birth		
Age at death – months	**1975-85**	1965-75	Pre-1965
<1	0.44	0.77	1.00
1-2	0.04	0.12	0.11
3-5	**0.05**	0.24	0.25
6-11	**0.02**	0.14	0.27
12-23	**0.01**	0.06	0.14
24-59	**0.003**	**0.01**	0.03
60-119	0.001	0.002	0.004
Mother's age			
<20	0.44	0.77	1.00
20-34	**0.75**	0.57	0.56
35+	**1.03**	0.89	-

Notes:
1. Main effects with column or row labels in bold type are significantly different from the baseline group.
2. Interaction terms in bold type are significantly different from the baseline group.

in the study population. Thus, after controlling for the effect of period of birth and age at death, children in the poorest households who are preceded by short birth intervals are 4.2 times[24] more likely to die than children in the wealthiest households who are born at least two years after the previous child.

Table 9.8 presents the estimated risks associated with each of the socio-economic and demographic factors which had an independent net impact on child mortality in the two Gazan communities during the 30 years prior to 1985. Also, to illustrate the multiplicative effect of these factors, the chances of dying in the neonatal period and at ages 6-11 months have been calculated for children simultaneously in the highest risk categories for all co-variates and for those in the lowest risk groups. These are presented in Table 9.9. The substantial fall in mortality during late infancy compared with the more moderate reduction in neonatal mortality is clearly demonstrated by the figures in this table.

[24] From Table 9.7: $(1.00 \times 1.89)/(0.61 \times 0.73) = 4.2$

Table 9.9 Estimated relative risks of dying for high and low risk groups at ages less than one month and 6-11 months, by period of birth

Period of birth and risk group	Relative risk* Age at death	
	<1 month	6-11 months
Pre 1965		
High risk (Birth interval <16 months, Mother's schooling 0-5 years, Commodities <3 basic, Mother's age <20)	1.000	1.000
Low risk (Birth interval 24+ months, Mother's schooling 6+ years, Commodities 3 basic+solar heater+luxury, Mother's age 20-34)	0.090	0.090
1965-75		
High risk (Birth interval <16 months, Mother's schooling 0-5 years, Commodities <3 basic, Mother's age 35+)	0.685	0.461
Low risk (Birth interval 24+ months, Mother's schooling 6+ years, Commodities 3 basic+solar heater+luxury, Mother's age 20-34)	0.070	0.047
1975-85		
High risk (Birth interval <16 months, Mother's schooling 0-5 years, Commodities <3 basic, Mother's age 35+)	0.453	0.076
Low risk (Birth interval 24+ months, Mother's schooling 6+ years, Commodities 3 basic+solar heater+luxury, Mother's age <20)	0.031	0.005

* Risk relative to the high risk group, pre-1965.
Source: Calculated from Table 9.8; for example, in Low risk group, risk of dying at age 6-11 months in 1975-85 = (0.67/1.86) x 0.73 x 0.61 x 0.44 x (0.02/0.27) = 0.0052.

9.3 Discussion

Most investigations which have examined the effect of birth spacing on child mortality in developing countries show that this demographic factor has a stronger and more consistent impact than either mother's age or birth order when each of the other variables is controlled. Data for other Palestinian populations do not exist but in Syria, for example, the length of the preceding birth interval has the greatest impact on mortality up to 18 months (Hanbaly and Callum, 1987). In rural areas of Syria, mother's age and birth order are individually significant but both lose their significance after the effect of birth interval has been accounted for. The survivorship of the previous child is also a very reliable predictor of child deaths in Syria. In the most wide-ranging study of this issue, Hobcraft *et al*. (1985) show that, after controlling for preceding and succeeding birth intervals and maternal education, the only excess risks associated with maternal age and parity in 39 developing countries are for the first born and children of teenage mothers. There is considerable variation in the results of other studies which have attempted to identify the most significant socio-economic correlates of mortality. Almost invariably, however, maternal education, in addition to at least one other variable which may be regarded as a proxy for income, wealth or standard of living, prove to be significant when the other

factor or factors are controlled. For example, Tekçe and Shorter (1984) show that in Amman, mother's education has the greatest impact on child mortality (up to age three) but housing quality, household head's occupation and household income also influence child survival.

The complex array of factors associated with the decline in mortality in ash-Shati and ash-Shajaʻiyya is demonstrated by the results of the regression-based analyses presented in this chapter. The Gaza findings have several features in common with the results from surveys conducted in other developing countries. Of all the factors investigated and the categories employed,[25] the length of the preceding birth interval has the greatest impact on mortality. After accounting for the effect of other significant factors, the risk for a child born after a birth interval of at least two years is only about one third (0.36) of that experienced by a child who follows less than 16 months after the preceding sibling. The relative risk for children in the low compared with the high risk group for mother's education is 0.73, while, for the wealthiest relative to the poorest households, it is 0.61 per cent (Table 9.8). The results of the analyses presented in this chapter also reveal that, in Gaza, the association between an early child death and an elevated risk of dying for the subsequent birth is almost entirely attributable to the effect of the intervening short birth interval.

Throughout the thirty-year period first-born children faced a significantly higher risk of dying (0.50) than infants who were born more than two years after the preceding sibling and a slightly elevated risk compared with offspring born after intervals of 16-23 months (Table 9.8). The excess risk in the first month of life must be attributed to difficulties in birth trauma. First-born children continue to be at a disadvantage at later ages because primiparae are inexperienced in child care. That the excess risk persists after maternal education is controlled is evidence that the practical experience of nurturing children confers useful skills which differ from those acquired by attending formal schooling in Gaza.

The risks associated with maternal age have changed over time. Until 1975 children born to women aged 20-34 experienced significantly lower risks of dying than the

[25] It is important to emphasize that alternative definitions of categories of a particular variable can alter the relative importance of the variable in determining mortality. For example, if the shortest birth interval category had been less than 12 months and the longest more than four years, then the difference in risks between short and long birth intervals would have been even larger.

offspring of teenage mothers. In more recent years there has been an apparent reversal in this pattern although the difference between the two groups is not statistically significant. Part of the explanation for the secular decline in the risk for births to teenage mothers is obscured because all birth to women under 20 years of age are included in one group. Sixty-two per cent of the births which occurred to teenage mothers before 1965 were to women under the age of 17, the corresponding figure for the period 1975-85 was 24 per cent. Thus, as a direct consequence of the rise in the age at marriage, rather few of the births to young women in the more recent past are likely to be affected by risks associated with the physical immaturity of their mothers. There are no data for births to older women in the period leading up to 1965. But, since 1965, children born to mothers over the age of 34 have experienced significantly higher risks of dying than the children of younger mothers. In contrast, in Gaza the increased mortality risks for high order births compared with parities two to six are not statistically significant. However, parity and maternal age are strongly confounded: 90 per cent of the children born to women aged 35 and above are seventh or higher order births.

The impact of maternal age is largely unaffected by birth spacing and the high mortality risks associated with both advanced age of the mother and short birth intervals persist throughout the first year of life and early childhood. Prematurity must be the cause of an unknown proportion of early deaths among the infants born shortly after the previous child and fatal congenital anomalies undoubtedly account for some of the neonatal deaths among the infants of the oldest group of mothers. In Chapter 8 it is suggested that the explanation for the elevated risks of dying between ages one month and five years which are experienced by the children of older mothers is linked to the presence of other children in the household. The evidence presented in this chapter supports this assertion.

Wealth and mother’s education have independent and significant positive effects on child survival. Wealth does not operate via demographic determinants. Maternal schooling reduces the excess risk associated with the advanced age of the mother whereas children of both educated and uneducated mothers who are born after short birth intervals face increased mortality risks of over 250 per cent compared with children born after long birth intervals. The most plausible explanation for this combination of results is that the adverse effect of the presence of older siblings is responsible for a substantial proportion of the post-neonatal and child deaths among the births to older mothers whereas the reduced survival chances resulting from short birth intervals are, primarily, the

consequence of poor physical constitution at birth. The skills of educated women can have a positive impact on the former but have less effect when an infant's physical constitution is negatively affected by the poor health of the mother.

The evidence indicates that wealth operates to affect child mortality by at least one, if not two, mechanisms. First, in the description of the results for the socio-economic model it is argued that children in poor households are at risk because of greater exposure to airborne infections which are transmitted rapidly in an over-crowded environment. Secondly, since the reduced mortality risks for children in wealthy households do not change with age (no interaction of wealth and age at death), it is also possible that these families have better access to curative medical care, including private doctors. An important finding is that there is no change in the relative mortality risks for children in the underprivileged compared with the richest households when mother's education is controlled. As already observed, this is not the case for births in the high and low risk maternal age groups. Taken together these two results suggest that the excess risk for births to older women are not a consequence of increased exposure to infection. Rather, the principal explanation for the elevated risks experienced by the offspring of these women must be that, compared with children of mothers who have not reached their 35th birthday, these children receive a lower average standard of care. This in turn must be largely attributed to the competition with other siblings for the mother's time and attention. Whether, in the case of an unplanned addition to the family, there is also an element of deliberate or unconscious neglect, cannot be determined.

The analysis shows that increased school attendance of mothers is correlated with a greater reduction in children's mortality during late infancy and at ages one to four than in the first few months of life.[26] Variations in the quality of child care must account for this pattern which persists throughout the thirty-year period under consideration. The mortality differentials must derive from either or both of a difference in the incidence of illness or an unequal fatality rate. In the case of deaths resulting from respiratory infections, the evidence suggests that mother's education is less important than household wealth. Maternal education may be associated with a higher standard of domestic hygiene, including the preparation of weaning foods, and thus be correlated negatively with the incidence of infections that are spread by the faecal-oral route. Moreover, the

[26] As explained in Section 9.2.3, the reason why this interaction is not present in the final model is that it is confounded with, but weaker than, the change in the age pattern of mortality over time.

incidence of such diseases may increase as children become progressively more mobile. Diarrhoea is one illness that is frequently associated with poor hygiene. The relationship between diarrhoea and maternal education in ash-Shati and ash-Shaja'iyya in 1985 is examined in Chapter 10. It seems likely, however, that part of the explanation for the reduced risks of dying experienced by the children of educated mothers is that they are more likely to recover from bouts of sickness than infants whose mothers have received very little schooling. The impact of differential access to curative medical care between the two groups of mothers is examined in the next chapter.

An alternative explanation for the greater impact of maternal education at later stages in childhood is that the children of educated mothers are less susceptible to disease and thus less severely affected by infections. One factor which does vary with age in Gaza is nutritional status and it is well established that malnutrition aggravates the outcome of many infections (see, for example, Tomkins, 1986). The two investigations of child growth in the Gaza Strip both emphasise that malnutrition in the area is associated with the weaning period. Its prevalence is relatively low in the first half of infancy and increases steadily up to some point in the second year of life.[27] The only cause of infant death data which are disaggregated by single months of age reveal that compared with deaths at ages 6-11 months, malnutrition is a contributing factor in a small proportion in the deaths at ages 1-5 months. In Jabalya refugee camp in the mid-1960s, malnutrition was the immediate or an underlying cause of 35 per cent of the 40 deaths at ages 1-5 months and 65 per cent of the 23 deaths which occurred in the second half of infancy (calculated from Guinena, 1977, p.45). In Buraij camp in 1982, malnutrition was a contributory factor in two of the nine deaths in the younger age group and two of the four deaths in the older age group (Abdalla and Guinena, 1983, p.7). No comparable data are

[27] A follow-up of 1151 births born in 1965-66 showed that the proportion of infants who weighed less than 90 per cent of the Harvard standard increased from 27 per cent at age one month to 35, 45, 65 and 75 per cent at ages 3, 6, 9 and 12 months respectively. In the second year of life the figure varied between 67 and 77 per cent (Guinena, 1977, p.46). (In a healthy population 15 per cent of children weigh less than 90 per cent of the standard for their age.) By the time another study was conducted in 1984 there had been a remarkable improvement in the level of nutrition but, again, the results reveal that child growth is most likely to be disrupted around the age of weaning. Of the children examined in 1984, the proportion who were stunted increased from 14 per cent of those aged 0-5 months to 17 and 26 per cent of children aged 6-11 and 12-23 months and was 19 per cent among children aged 24-35 months (Jabra, 1984, p.4). The corresponding figures for wasting were 2.8, 3.7, 3.9 and 0.5 per cent respectively.

available for older ages. It would seem entirely plausible that the timing and type of weaning foods introduced by educated mothers are more appropriate for children's nutritional requirements. This possibility is examined in Chapter 10.

To summarise, this chapter provides an assessment of the relative importance of factors associated with the secular decline in infant and child mortality. Social and economic differences at the family and household level and variations in child-bearing patterns have all influenced child survival. When other factors are controlled, the largest mortality differential identified is at the level of the individual child, that is between a child who is born after a very short birth interval and a child who follows at least two years after the preceding sibling. Higher occupation status of the husband and lower housing density are positively correlated with child survival. But, as the detailed discussion of the results shows, both of these measures of economic status are strongly confounded with household wealth which is a more powerful predictor of mortality risks in Gaza city. Compared with the relative affluence of the household, mother's education has a slightly smaller impact on infant and child mortality. Moreover, there is evidence that the relationships between maternal education and child survival and wealth and survival are mediated by different proximate risk factors. Wealth would appear to be associated with more effective treatment of sickness and also operates to reduce mortality by limiting exposure to airborne infections. In contrast, compared with mothers who have received little or no schooling, educated mothers provide a higher standard of general health care, as opposed to sickness management, for their children. This explains the attenuation in the excess mortality risks experienced by the children of older mothers when the effect of the level of maternal education has been accounted for.

Finally, it is important to emphasise that while the regression-based analyses permit the identification of several variables which are associated with the decline in mortality, the impact of other important factors cannot be investigated. This group of variables can be termed community level factors. They represent those changes in economic and environmental conditions which occurred between the 1950s and 1985 which are not captured by the variation between categories of the factors whose impact is assessed. The most obvious omissions are improvements in the quality and quantity of water available to households, the increase in *per capita* income and food availability, and the effects of variations in access to preventive and curative health services which are net of those represented by the included socio-economic variables. The single variable period of birth, which is present in the mortality models, is a proxy for all these community level factors.

It represents the combined impact of all unspecified determinants of mortality. Compared with births in the period prior to 1965, the average mortality risks for births in the years 1965-75 and in the period 1975-85 are 77 and 44 respectively. Thus, the change in the level of mortality explained by these factors is similar in magnitude to the combined effect of maternal education and wealth.[28] An important part of the explanation for the poor survival chances of children born to young mothers in the distant past is revealed by this clarification of the range of factors encompassed by the period of birth variable. This is that the children of teenage mothers are particularly vulnerable when living conditions are unfavourable. More generally, the evidence presented in this chapter demonstrates how the socio-economic determinants, operating via demographic or behavioural factors, have contributed to the decline in mortality in ash-Shati and ash-Shajaʻiyya between the 1950s and the mid-1980s.

[28] Table 9.8 shows that, compared with children of uneducated mothers in the poorest households, the mortality risks experienced by children of educated women in the wealthiest households are: 0.67 x 0.73 =0.45.

CHAPTER 10

DETERMINANTS OF MORTALITY IN THE 1980S

This chapter investigates the correlates of mortality in the 1980s. By mid-1982 to mid-1985, the estimated probability of death in the first year of life in the two communities had fallen to 26.4 infant deaths per thousand live births. Because of the substantial decline in mortality, and the changing pattern of age at death, it seemed improbable that the factors which are significantly correlated with mortality over the thirty-year period leading up to the survey would also be the most important determinants of mortality in the 1980s. To identify those children at greatest risk in ash-Shati and ash-Shaja'iyya in the 1980s, the first part of this chapter analyses the data on children born in the three years preceding the survey using log-linear rates models. Reproductive and socio-economic variables which are associated with current mortality are identified and the effect of the significant remote determinants on the intermediate demographic variables is assessed. In the second stage of the investigation, in Section 10.2, the mechanisms through which the remote variables operate to affect child health are explored further when differentials in immunization status, infant feeding practices and the treatment of diarrhoea are examined. Finally, the results are drawn together in the discussion which is presented in Section 10.3.

10.1 Correlates of recent mortality

The log-linear rates model for births in the three years preceding the survey includes five age intervals (less than one month, 1-2, 3-5, 6-11, and 12-35 months). The impact of all of the variables which were added to the model for the thirty-year period is examined. In addition, two other variables, sex of the child (*SEX*) and whether the mother received ante-natal care before the birth of the index child (*ANC*) are included in the analysis. Puffer and Serrano (1973) *inter alia*, have shown an inverse correlation between mortality and ante-natal care. Medical supervision of the pregnancy and/or the transmission of knowledge about appropriate infant care may explain this relationship. Alternatively,

Table 10.1 Estimated relative risks of dying 1982-85, by mother's age and years of schooling, sex and ante-natal care, controlling for age at death and other factors

Model – *Age at death* +	Fit* P =	Risks relative to high risk group			
		Mother's years of schooling	*Mother's age* (1) 20-34 (2) <20	*Ante-natal care*	*Sex*
A. Mother's age	<0.01				
35+			1.00		
20-34			**0.44**]		
<20			**0.08**]		
B. Mother's years of schooling	<0.005				
0-5 years		1.00			
6+ years		**0.36**			
C. Sex of child	<0.05				
Female					1.00
Male					0.47
D. Ante-natal care	<0.05				
Yes				1.00	
No				**0.39**	
E. Mother's age + years of schooling	<0.05				
		0.41	(1) 0.63]		
			(2) **0.12**]		
F. Mother's age + ante-natal care	<0.05				
			(1) **0.42**]	**0.38**	
			(2) **0.08**]		
G. Mother's age + sex	<0.05				
			(1) **0.43**]		**0.45**
			(2) **0.08**]		
H. Mother's schooling + ante-natal care	<0.05				
		0.36		**0.39**	
I. Mother's schooling + sex	<0.05				
		0.35			**0.46**
J. Mother's age + schooling + ante-natal care + sex	<0.05#				
		0.43	(2) 0.58]	0.42	0.47+
			(1) **0.11**]		

Notes:

* This model compared with the more restricted model

\+ Difference in risks between boys and girls this model, P=0.053.

\# This model compared with model including mother's age and schooling and ante-natal care.

1. Risks in bold type are significantly different from the baseline group.
2. Bracketed risks are not significantly different from each other.

women who attend ante-natal clinics may use medical services more appropriately than non-attenders.

Despite the small number of births (1031) and deaths (30) in the three-year period, the analyses suggest that four factors are correlated with mortality in the two communities in

the 1980s. These are maternal age and education, sex of the child and whether or not the mother received ante-natal care. The results of the addition of these four variables to a variety of models are shown in Table 10.1. No significant interactions were identified, but this is not surprising given the small size of the sample.

In the 1980s, the children of mothers over the age of 35 experience a significantly higher risk of dying than the sons and daughters of younger mothers (Table10.1, model A). Although the children of teenage mothers are less likely to die than those born to women aged 20-34, this difference is not statistically significant.

The children of mothers who have attended school for at least six years experience significantly better survival chances than those of poorly educated women (Table10.1, model B). Again, the risks between the 6-9 and 10+ educational categories are never significantly different from each other so these are grouped together. The impact of maternal education is confounded with that of maternal age. The advantage of children in the highly educated group is reduced by 14 per cent when the effect of the age of the mother at the time of the birth is accounted for (change in the relative risk from 0.36 in model B to 0.41 in Table 10.1 model E), but the risks for the two education sub-groups remain significantly different from each other. After controlling for maternal education the risk for the 35+ group is no longer significantly higher than that for the 20-34 age group. This result demonstrates that in the 1980s variations in education account for an important part of the difference in mortality levels among children in these two groups. In contrast, the children of very young mothers experience significantly better survival chances than infants born to women over the age of 35 even after the higher educational attainment of the young women is taken into account.

The final model (model J) shows that girls are about twice as likely to die by age three as boys, the estimated relative risk for males is 0.47. Confidence intervals on the excess risk for girls are wide because of the small number of events on which the estimates are based but comparison with UNRWA data for the Occupied Territories and the findings for other Palestinian populations (Chapter 3) indicates that the excess risk in females is unlikely to be spurious although the magnitude of the effect can be debated. For example, in 1982, the male and female infant mortality rates in Buraij camp were 40 and 95 deaths per thousand live births,- a risk for males compared with females of 0.42 (Abdalla and Guinena, 1983, p.3). In 1986, the male and female infant mortality rates for West Bank refugee camp residents were 22 and 31 deaths per thousand live births respectively (UNRWA, 1987). The Gaza survey results also show that the daughters of young women

Table 10.2 Place of birth of children born 1982-85, by community, mother's age and years of schooling and birth order

	Percentage of total births			
	Government hospital	UNRWA/Government clinic	Home	Private clinic or abroad
Total	46	42	10	2
Community				
Ash-Shati	50	33	13	4
Ash-Shaja'iyya	43	48	8	1
Mother's age				
<20	62	27	9	2
20-34	42	46	10	2
35+	47	36	14	3
Birth order				
First	75	15	7	4
2-6	39	49	11	2
7+	42	44	12	2
Mother's years of schooling				
0-5 years	45	43	11	1
6+ years	46	41	10	3

Table 10.3 Percentage of births in 1982-85 preceded by ante-natal care, by community and mother's age and years of schooling

	Percentage of births preceded by ante-natal care	
	Yes	No
Total	87	13
Community		
Ash-Shati	99	1
Ash-Shaja'iyya	78	22
Mother's age		
<20	88	12
20-34	87	13
35+	89	11
Mother's years of schooling		
0-5 years	86	14
6+ years	88	12

face the same increased probability of dying as the girls born to older mothers (no change in the risks for either maternal age or sex when the other variable is controlled - see Table 10.1, models A, C and G). In addition, there is no attenuation in the relative mortality risks for daughters compared with sons among the offspring of educated mothers (Table 10.1, models C and I). This finding is not unique. Evidence that female education does not eliminate sex bias is also available for Pakistan (Das Gupta, 1987).

Eighty-eight per cent of the children who were born during the three-year period prior to the survey were born in either the Government hospital or the maternity units of the UNRWA or Government clinics (Table 10.2). This figure is significantly higher than that

of 57 per cent for all births in the Gaza Strip in 1985 (Israel, CBS, SAI, 1987, p.704). Only 13 per cent of ash-Shati and ash-Shaja'iyya mothers did not receive ante-natal care before the infants were born (Table 10.3). However, the risk for births whose progress was monitored in the ante-natal period is significantly lower, relative risk=0.39 than that for births to women who were not medically supervised during pregnancy (Table 10.1, models D). The children in the latter group are more likely to die during the first month of life and at older ages. Surprisingly, there is no association between either maternal education or maternal age and attendance at ante-natal clinics. Older and uneducated mothers are as likely as their younger and educated counterparts to seek ante-natal care (Table 10.3). The finding that infants whose mothers received ante-natal care experienced enhanced survival chances in the neonatal period suggests that the care provided to pregnant women has a positive effect on the constitution of their infants. However, since the advantages extend beyond the first month of life, it is also possible that women who seek ante-natal care are a select group, that is they have the resources, for example time, to devote to taking care of their own and their children's health. Support for this selection bias explanation is provided by the combination of the absence of any attenuation in the risk associated with advanced maternal age after receipt of ante-natal care is controlled and the fact that only 3 of the 8 deaths among the children of older mothers occurred during the first month of life. The relationship between ante-natal care and other proximate determinants is examined in Section 10.2.

All four significant variables identified improve the fit of the model when each or all of the others are included. Thus the model which most adequately describes the data is *AGE+MAG+MED+ANC+SEX* (Table 10.1, model J). Controlling for all of the other factors, the reduced risk for births to educated women is 0.43, for births preceded by ante-natal care it is 0.42, and for male children the figure is 0.47. The children of mothers aged 35+ are nine times more likely to die before age three than the sons and daughters of teenage mothers but the other differences by maternal age are not statistically significant.

As the results presented in Table 10.4 indicate, none of the other variables examined are significantly correlated with early child mortality in ash-Shati and ash-Shaja'iyya in the 1980s. The direction of the risks for most factors confirm expectations especially when obvious confounding variables are taken into account. The results for the birth interval variable are, however, particularly surprising given its prominence in the analysis of births in the period 1955-85. Although children born after short intervals are two-and-a-half times more likely to die than first births, the difference is not statistically

Table 10.4 Estimated relative risks of dying 1982-85, by selected demographic and socio-economic characteristics, controlling for age at death

Model - *Age at death* +		Model - *Age at death* +	
Independent variable	Relative risk	Independent variable	Relative risk
Community		*Husband's presence*	
Ash-Shati	1.00	Present	1.00
Ash-Shaja'iyya	1.18	Absent	1.28
Previous birth interval		*Household commodities*	
First births	1.00	<3 basic	1.00
<16 months	2.58	3 basic	1.10
16-23 months	1.12	3 basic + solar water heater	1.03
24+ months	2.46	3 basic + solar + 'luxury'	0.77
Birth order		*Husband's occupation*	
First birth	1.00	Unskilled	1.00
2-6	1.83	Skilled	0.59
7+	2.13	Absent	1.07
Survival of the last-born child		*Husband's years of schooling*	
Survived	1.00	0-5 years	1.00
Died	1.53	6-9 years	1.43
		10+ years	1.37
		Absent	1.68
		Housing density	
		4+ persons per room	1.00
		<4 persons per room	1.45

Notes:
1. No model provides a significant improvement in fit over the model with age at death only.
2. No risks are significantly different from the risk in any other category.

significant. The increased risk for children born after long intervals is explained by the confounding between birth interval length and mother's age.[29] Short birth intervals are linked with low birth weight (Zhu *et al*., 1999) and there may have been relatively few low birth weight infants in ash-Shati and ash-Shaja'iyya in the 1980s. Data on birth weight in Gaza are available from two sources. According to government figures, 5.2 per cent of the births in medical facilities in June 1983 weighed less than 2500 grams (Israel, MH, 1986, p.126). Vermund *et al*. (1985) believe this figure is too low. But the UNRWA figure for births in the Buraij refugee camp maternity ward was 4.5 per cent in 1982 when the infant mortality rate was estimated at 65 deaths per thousand live births (Abdalla and Guinena, 1983). Also in 1986, when the estimated neonatal mortality rate in the West

[29] Sixty-nine per cent of births to women over age 35 were preceded by intervals of at least two years and only 12 per cent were born within 15 months of the previous sibling. Excluding first births, the corresponding figures for the youngest group of women were 18 and 36 per cent. When the birth interval variable is added to a model which includes mother's age (not shown) the risks to children following short and long intervals change from 2.58 and 2.46 to 1.38 and 1.02 respectively.

Bank camps was 15.9 deaths per thousand live births only 5.0 per cent of the 2569 live births weighed less than 2500 grams (UNRWA, 1987). The estimated neonatal mortality rate for the study population in 1982-85 is 15.4 per 1000 and, as noted earlier, 90 per cent of the births in this period took place in a medical institution. It is reasonable to assume that the proportion of low birth weight infants in ash-Shati and ash-Shaja'iyya is similar to the proportions observed for these other populations. Clearly the impact of birth interval length on birth weight and mortality in Gaza requires more detailed investigation. It is evident, however, that in the study population the risks associated with short birth intervals are smaller than in the past, and that in the 1980s, mother's age and education, sex of the child, and whether the birth was preceded by ante-natal care are more closely associated with mortality at early ages.

10.2 Intermediate child care variables

The interaction between a child's nutritional status and exposure and susceptibility to disease is well-established, although impossible to quantify precisely (see, for example, Scrimshaw *et al*., 1968; Tomkins, 1986). Each of these three risk factors is associated with a number of intermediate variables. The importance of each intermediate variable may vary, both with the age of the child and the presence of other biological and behavioural proximate health determinants. To supplement the mortality data differentials in three proximate child care variables are discussed in this section. These are infant feeding practices and use of preventive and curative services. The aim is to identify mechanisms which explain the inferior survival chances of girls, the children of poorly educated mothers and the children whose mothers do not receive ante-natal care.

Numerous studies have substantiated the nutritional and immunological benefits of breast milk (see, for example, Ebrahim, 1982; WHO, 1985). In addition to providing all of the protein and energy requirements of young infants, human milk contains other important minerals and trace elements not present in reconstituted milk. The presence of immunoglobins, leucocytes and other biologically active substances provide protection against gastrointestinal disease, respiratory infections, allergies and other illnesses (Population Reports, 1981). It is widely agreed that exclusive breast feeding is the optimal mode of feeding for infants up to four months of age and that supplementation of the diet, especially with protein-rich foods, should start no later than the seventh month (Underwood and Hofvander, 1982). In later infancy and early childhood the

immunological properties of mother's milk decrease but correctly supplemented breast feeding may continue to offer protection, for example against diarrhoea (Feachem and Koblinsky, 1984). An artificially-fed infant is not only deprived of the protective effect of maternal antibodies, but may also face increased exposure to infections from unhygienically prepared bottle feeds. Nutritious food supplements, improperly prepared, are also a potential source of infection. Moreover, incorrect reconstitution of powdered milk renders this inferior source of nutrients even more detrimental to infant health. Thus inappropriately fed infants may fail to thrive because of their poor nutritional status, increased exposure and susceptibility to infections, or, more likely, as a result of the synergism between these three risk factors. The relationship between early bottle feeding and both increased infant mortality and morbidity in developing countries is well-documented (see, for example, Plank and Milanesi, 1973).

To examine the relationship between maternal education, gender of the child and infant feeding practices, four indicators for the latter are constructed from the information collected about the most recent live birth. The mean duration of breast feeding and the age at which milk other than breast milk is introduced is calculated using the prevalence-incidence method (see Section 4.2.1). The proportions of infants who are first given food before age four months and after the sixth month are also estimated.

The proportion of living children aged one year and above who receive the measles vaccination is used as the indicator of use of preventive health services. Dead children are excluded in order to avoid problems arising from reverse-causation (failure to be vaccinated may be associated with pre-existing sickness rather than a cause of ill-health). The measles vaccine, given at age nine to eleven months, is the last in the series of infant inoculations. Health workers in Gaza are instructed to ensure that a child has received the scheduled doses of Polio and DPT vaccine before they administer the measles vaccine. Thus, in addition to indicating the proportion of children protected against one serious communicable disease, immunization status is also a better measure of use made of other post-natal preventive services than the answer to the question, 'Has this child received post-natal care' (children's questionnaire, Q.12).

The final intermediate variable considered is curative treatment. Unlike the other proximate determinants discussed, this is a measure of sickness care rather than preventive or healthy child care practices. As the survey took place in early Summer several questions designed to establish whether a child had diarrhoea during the two

Table 10.5 Current infant feeding practices, by community, mother's age and education and sex of child

	Mean age (months)		First given food (% of births)	
	Weaned from breast	Given non-breast milk	0-3 months	7+ months
Total	12.0	3.8	13	22
Community				
Ash-Shati	11.7	4.1	14	22
Ash-Shaja'iyya	12.2	3.6	12	22
Mother's age				
<20	10.6	2.4	16	14*
20-24	12.1	3.9	13	21
35+	13.0	5.5	12	28
Mother's years of schooling				
0-5 years	12.1	4.6	12	27**
6+ years	12.0	3.6	15	19
Sex of child				
Male	12.8	4.8	14	20
Female	11.2	2.8	12	24
Mother's years of schooling and sex				
0-5 years, male	13.5	5.7	12	25
0-5 years, female	10.2	3.3	11	29
6+ years, male	12.5	4.5	16	16
6+ years, female	11.4	2.7	13	21

Chi square ** P=<0.01 * P=<0.05

weeks preceding the survey were included in the children's questionnaire. If a mother answered yes to at least two of the three questions about change in the frequency (increase), colour, and volume (increase) of a child's stool, that child is regarded as having suffered from diarrhoea. According to this crude measure of diarrhoea occurrence almost one in five children had at least one episode of gastrointestinal upset during the two-week period.[30] The proportion of children suffering from diarrhoea who are taken to see a doctor is used as a measure of maternal response to illness.

10.2.1 Infant feeding practices

The differentials in infant feeding practices by gender of the child and mother's school attendance are presented in Table 10.5. Moderately prolonged breast feeding is the norm in Gaza; children are weaned from the breast at an average age of 11.9 months in ash-Shati and 12.2 months in ash-Shaja'iyya. These figures are remarkably close to the mean

[30] Since the focus of the study is mortality and its proximate determinants more detailed questions on child morbidity were not included in the questionnaire. The primary aim of the diarrhoea questions was, it is emphasised, to examine patterns of sickness management.

of 11.9 months reported by Anderson *et al*. (1986) for 769 women living in two Gazan refugee camps in 1978. In the study population the differentials by maternal education are small. This finding, which is encouraging, contradicts the results from most other investigations of breast feeding patterns in most developing countries which show that the length of breast feeding decreases monotonically with increases in women's education (see, for example, Ferry and Smith, 1983). Young educated women in ash-Shati and ash-Shaja'iyya resort to two reference groups for advice on childrearing, - older more experienced mothers and health professionals. Older women are strong advocates of breast feeding and both Government and UNRWA health workers encourage women attending the clinics to nurse their infants. Thus, in terms of the beneficial effects of breast feeding at least, there is no contradiction in the message received by educated mothers from these two sources.

Unfortunately, but not surprisingly, there is also clear evidence of the impact of television and pharmacy promotion of infant milk formula. Educated women appear to be the most susceptible to these influences of the modern world. The average age at which their infants receive reconstituted powdered milk is 3.6 months whereas uneducated women introduce bottles about one month later. The differentials in breast feeding durations and age at supplementation by gender of the child, before and after controlling for the education of the mother, are more revealing. Boys are weaned slightly later than girls and given milk other than breast milk a full two months later than girls. Although none of the subgroups is benefiting fully from the superior quality of breast milk, the daughters of educated women are the most disadvantaged. On average these girls are introduced to the bottle in the third month of life whilst the sons of poorly educated women are exclusively breastfed until half-way through the sixth month. The male offspring of educated women are more fortunate than the daughters of the minimally educated group; the latter receive breast milk substitutes early in the fourth month of life. When questioned directly, there was unanimous agreement among mothers that breast milk is the optimal source of nutrients for infants. Mothers also denied any discrimination against girls in feeding practices. However, while the estimates derived from the current status method show differences in the length of full-plus-supplemented breast feeding which are relatively unimportant in health terms, the early age at which girls in particular receive artificial milk is a cause for concern. Girls are denied the full immunological protection provided by breast milk. Also, as breast feeding promotes bonding between the infant and its mother, and as bottles are frequently administered by other female family

members including siblings, daughters are disadvantaged in this respect. The questionnaire did not distinguish between the use of special infant formula which, when properly prepared, is not detrimental to infant health and the cheaper, all-purpose powdered milk which is unsuitable for infants. Therefore, the impact of the observed feeding patterns on the nutritional status of the disadvantaged children cannot be determined.

Only 65 per cent of the children are first given semi-solid food at the optimal age of four to six months. Almost a quarter of the infants receive only milk until the eighth month of life or later. These children are more likely to be malnourished. For example, in Amman, 50 per cent of children aged 6-11 months who were not receiving solids had a weight below 90 per cent of the standard whereas 26 per cent of infants in the same age group who were receiving solid food had a weight-for-age in this low range (Population Council, 1982). The introduction of food into the diet of girls and that of the offspring of uneducated women is more likely to be delayed. The difference for the educational categories is statistically significant. Twenty-seven per cent of infants of the minimally educated group are first given food later than the optimal age compared with 19 per cent of infants whose mothers had completed elementary school.[31] The observed gender and educational differentials persist when the other variable is controlled. The cause of death data for Buraij camp suggests that sex differentials in nutritional status are partly responsible for the poorer survival chances of female infants in the Gaza Strip in the 1980s. Of the 6 boys and 14 girls who died at ages 1-11 months in this refugee camp in 1982, malnutrition was cited as one of the causes or the single cause of death of 7 female infants but it was a contributory factor in the death of only one of the males (Abdalla and Guinena, 1983, p.6).[32]

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[31] There are negligible differences in the weaning foods favoured by educated and uneducated women. Yoghurt, cerelac (a commercially prepared infant cereal), biscuits, fruit, vegetables and eggs are the most frequently reported first foods given.

[32] There is evidence from two studies in the West Bank that the nutritional status of young boys is superior to that of young girls. In 'Ain al-Dyuk, a village in the Jordan valley, 51 per cent of girls under age five, compared with 34 per cent of boys, were found to be malnourished (UPMRC/BZUCHU, 1988). The corresponding figures for children aged 0-35 months in three villages in the West Bank highlands who were weighed and measured in 1981 are 52 and 32 per cent (Giacaman, 1988 p.123) and, 'female infants were found to be significantly more malnourished at all ages and to suffer from its more serious forms.' (Giacaman, 1988 p.153).

Table 10.6 Measles vaccination status of living children aged 12-35 months by other characteristics

	Percentage received measles vaccination	
	Yes	No
Total	86	14
Community		
Ash-Shati	87	13
Ash-Shaja'iyya	85	15
Mother's age		
< 20	90	10
20-34	86	14
35+	80	20
Mother's years of schooling		
0-5 years	83	17
6+ years	87	13
Sex of child		
Male	86	14
Female	86	14
Mother's years of schooling and sex		
0-5 years, male	87	13
0-5 years, female	79	21
6+ years, male	85	15
6+ years, female	88	12
Ante-natal care[*]		
Yes	87	13
No	78	22

[*] Chi square P=0.051

The tendency to introduce food supplements too early would appear to be a lesser problem in the study population but it is the educated women and mothers of boys who are more prone to adopt this undesirable practice. It would appear that these groups are more likely to respond to the maxim, 'a fat baby is a healthy baby', by giving food too early.

10.2.2 Vaccinations

An estimated 86 per cent of children aged exactly one year and above had received the measles vaccination (Table 10.6). While such a high proportion is very encouraging for a developing country, it is to be compared with the finding that 97 per cent of living children aged over 40 days are protected against tuberculosis (BCG vaccination).

Data from at least two countries (the Philippines and Ghana) indicate that participation in mass immunization campaigns may not be selective of the better educated (Friede *et al*., 1985; Belcher *et al*., 1978). In other studies though, a positive correlation between the number of years of formal school attendance and use of preventive health services is observed (El-Zanaty *et al*., 1996; Cleland and van Ginneken, 1988; Tekçe and

Shorter, 1984). The Gaza results show that women's awareness of the importance of preventive child care increases slightly as the level of maternal education improves. Eighty-seven per cent of the sons and daughters of highly educated mothers had received the measles vaccine compared with 83 per cent of the offspring of the minimally educated group. There is also a tendency for poorly educated mothers to take their sons to clinics more frequently than their daughters, but the result is not statistically significant. Thus, encouragingly, in terms of routine preventive care, there is no evidence of preferential treatment of boys among the mothers in ash-Shati and ash-Shaja'iyya.

Eighty-seven per cent of the children of mothers who attend ante-natal clinic complete their vaccination schedule compared with 78 per cent of the offspring of women who do not receive ante-natal care (P=0.051). One interpretation of this result is that it is not only the medical attention which the women receive during the ante-natal period but also the advice about infant care provided at the ante-natal clinic which is important for child health in the study population. An additional or alternative possibility is that some women are unable, or unwilling, to use the preventative health services that are available in the refugee camp and the town.

10.2.3 Curative treatment

Fourteen per cent of the children under three years of age in the refugee camp suffered from diarrhoea in the two weeks prior to the survey (Table 10.7). The corresponding figure for children living in the city was 22 per cent. However, climatic variations probably account for a substantial part of the increased number of cases among children living in the town. Since the interviews in ash-Shati were conducted at the end of the Spring (late April to early May), and those in ash-Shaja'iyya during the early summer (mid-May to early June). The differences in diarrhoea by education and gender subgroups are negligible. The obvious explanation for this finding is that exposure to infection for all the subgroups is similar; that is the effect of the contamination of the physical environment predominates over any differentials in child care practices which might be expected to result in a lower incidence of diarrhoea among boys or the offspring of educated women. Alternatively, the results may simply reflect opposite biases in incidence and reporting: for example, a smaller proportion of the children of educated

Table 10.7 Percentage of living children aged 0-35 months who experienced diarrhoea in the two weeks preceding the survey and percentage who were referred to doctors

	Diarrhoea in last	Treatment of diarrhoea

	two weeks (%)	By doctor (%) (1)	By private doctor (as % of 1)
Total	18	34	16
Community			
Ash-Shati	14*	30	11
Ash-Shaja'iyya	22	36	18
Mother's age			
< 20	21	33	17
20-34	18	36	15
35+	16	22	25
Mother's years of schooling			
0-5 years	19	29	7
6+ years	18	36	19
Sex of child			
Male	18	39	19
Female	18	29	12
Mother's years of schooling and sex			
0-5 years, male	19	30	0
0-5 years, female	19	27	17
6+ years, male	18	42	25
6+ years, female	18	30	10

* Chi square P<0.001

mothers may have had diarrhoea but more of their mothers identified and reported the illness.[33]

Of the 182 children who experienced diarrhoea, 34 per cent were referred to a doctor for treatment, 38 per cent of the diarrhoea cases were managed at home and in 23 per cent of cases no action was taken. A small minority of children (5 per cent) were treated by a pharmacist. Boys are more likely than girls to be treated professionally;- 39 and 29 per cent respectively (Table 10.7). Data from refugee camps in the West Bank illustrate how such a differential in curative care may result in a variation in survival between boys and girls. In 1986, a total of 4 male and 11 female infants died from infectious diseases in the West Bank refugee camps (UNRWA, 1987). All four boys died in hospital while seven of the girls died at home. Since no morbidity data are available it cannot be established

Table 10.8 Estimated relative risks of dying and neonatal and infant mortality, 1982-85, by sex, mother's years of schooling, ante-natal care and mother's age

[33] There is some evidence to support the environmental explanation. In ash-Shati, children who lived in houses where the toilets drained into an open sewer channel were twice as likely to be reported as suffering from diarrhoea as those who resided in houses where the toilets were connected to cess pits or the closed sewer system (24, 13, and 13 per cent respectively; P=<0.10) and the differentials by gender and mother's education were negligible.

	Female				*Male*			
	Mother's years of schooling				*Mother's years of schooling*			
	0-5 years		6+ years		0-5 years		6+ years	
	Ante-natal care		*Ante-natal care*		*Ante-natal care*		*Ante-natal care*	
Mother's age	No	Yes	No	Yes	No	Yes	No	Yes
35+								
Relative risk*	1.00	0.42	0.43	0.18	0.47	0.20	0.20	0.08
Neonatal mortality	263	121	123	54	134	59	60	26
Infant mortality ($_1q_0$)	409	200	202	91	219	99	101	44
(% of births)	(0.1)	(1.7)	(0.3)	(1.8)	(0.1)	(3.9)	(0.4)	(2.0)
20-34								
Relative risk*	0.58	0.24	0.25	0.10	0.27	0.11	0.12	0.05
Neonatal mortality	163	72	73	32	80	35	35	15
Infant mortality ($_1q_0$)	263	121	123	54	134	59	60	26
(% of births)	(1.6)	(5.6)	(3.4)	(24.1)	(1.3)	(6.8)	(3.2)	(25.4)
<20								
Relative risk*	0.11	0.05	0.05	0.02	0.05	0.02	0.02	0.01
Neonatal mortality	33	14	14	6	16	7	7	3
Infant mortality ($_1q_0$)	56	24	25	11	27	12	12	5
(% of births)	(0.5)	(2.7)	(1.0)	(6.1)	(0.1)	(2.0)	(0.9)	(5.1)

* Risks relative to rates for girls born to mothers aged 35+ with 0-5 years of schooling who did not receive ante-natal care.

Source: Model AGE+MAG+MED+ANC+SEX

whether sex differentials in the incidence of these diseases in this population exist, but it can be inferred from the mortality data that mothers seek medical help more frequently and probably at an earlier stage in the illness of sons. In the Gaza study 36 per cent of educated mothers consulted a physician about their child's illness while only 29 per cent of the uneducated women reported doing so. As the figures in Table 10.7 show, the gender differentials persist when maternal education is controlled, indeed in terms of curative treatment, the preferential care of sons is particularly notable among educated women.

Women in the study population claimed that private physicians are more thorough in their examinations and provide a higher overall standard of care than the government and UNRWA employees. Differences in the proportion of children taken to private doctors may be determined by both the ability of a family to pay for what is perceived to be a superior service, and the priority given by parents to such care. Mothers of only ten (16 per cent) of the sick children who were taken to a doctor paid for a private consultation. Despite the very small number of cases, the results in Table 10.7 indicate that educated women and the mothers of sick boys are more likely to seek private treatment.

10.3 Discussion

The estimated probabilities of dying in the first month and first year of life in 1982-85 for ash-Shati and ash-Shaja'iyya combined are 15.3 and 26.4 per thousand. These overall figures obscure substantial differentials prevailing among subgroups in the study population. The regression-based mortality analysis in the first part of this chapter shows that maternal age and education, sex of the infant, and receipt of ante-natal care are significantly associated with the survival chances of children in Gaza in the 1980s. Table 10.8 shows the relative risks and neonatal and infant mortality rates for each of the 24 categories of births and the proportion of births in each subgroup. The probabilities of dying during the first year of life are also presented graphically in Figure 10.1. However, it is important to emphasise that because the estimates are derived from a total of only 30 deaths and 1031 live births the confidence limits for most of the estimates are large. This is particularly true for sub-periods such as neonatal mortality (Table 10.8).

The daughters of poorly educated women aged 35+ who did not receive ante-natal care have an estimated relative risk of dying which is exactly 100 times greater than that of sons born to young educated women who had ante-natal care. Only 5 per cent of births are located in the latter category but the estimated infant mortality rate for this group - 5 deaths per thousand live births - is lower than the level prevailing in most developed countries. By contrast, two out of every five girls (or 409 per thousand) born in the highest risk category do not survive to their first birthday. These figures clearly represent the extremes in the range of mortality in ash-Shati and ash-Shaja'iyya. Sixty-one per cent of all the births are experienced by educated women under the age of 35 who receive ante-natal care. From the distribution of births it is obvious that a reduction in the mortality of girls to the level prevailing among boys would have the greatest impact on mortality before age three in the two communities. Ensuring that all females attended school for at least six years would result in a larger decrease in mortality than if all women ceased childbearing at age 34. Since only a small minority of births in the study population are not preceded by ante-natal care, the elimination of this category would result in the smallest improvement in the overall level of child survival, but this would only be the case if there is a causal relationship between ante-natal care and infant survival and the Gaza Survey data do not provide conclusive evidence of such a relationship.

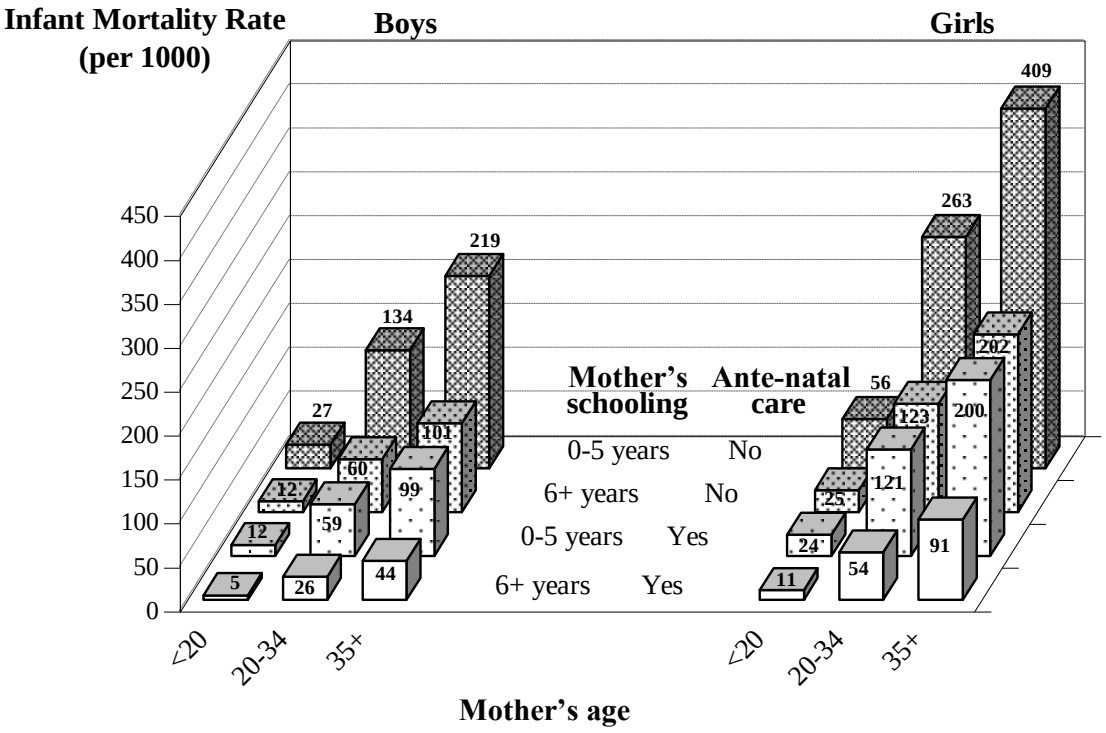

Figure 10.1 Estimated infant mortality rates for sub-groups of the survey population, 1982-85
Source: Table 10.8.

The increase in the level of female education over the past 30 years is documented in Section 5.3. Eighty-one per cent of women in their twenties have completed primary school compared with 65 per cent of women in their thirties and only 12 per cent of women aged 40-49. Thus, if the conditions prevailing in the two communities in 1985 remained unchanged, child mortality would be expected to continue to decline solely as a consequence of the reduction in the proportion of children born to women who attend school for less than six years. The examination of selected child care variables suggests that one of the factors contributing to the lower mortality of the children of educated mothers is the increased tendency of these women to seek medical advice when their children are ill. Another aspect of care which probably affects the nutritional status, if not the survival chances, of children is the timing of the introduction of semisolid food into their diet. A significantly higher proportion of poorly educated mothers postpone giving food to their infants until the eighth month of life or later.

The mothers of 13 per cent of the infants who were born between mid-1982 and mid-1985 reported that they did not receive medical supervision during their pregnancies. Compared with the children of ante-natal clinic attenders, the children of mothers who did not receive ante-natal care are about 2.4 times more likely to die during both the neonatal

period and at later ages. It would appear that women's attendance at ante-natal clinics operates to reduce child mortality via at least one of two mechanisms. First, medical supervision is associated with an improvement in the mother's physical well-being which has a positive effect on the infant's constitution at birth. Secondly, the differentials in immunization status indicate that women who receive ante-natal care are more likely to adopt preventive health measures which benefit their children. This may be a consequence of their increased exposure to health workers' promotion of vaccinations and other aspects of child care which are important for the healthy development of young boys and girls. The only alternative explanation for the persisting elevated risks among the offspring of non-attenders is that these mothers are disinterested in any addition to their existing family and therefore avoid practices which enhance child survival. Deliberate neglect is discounted since the women who make least use of preventive services tend to seek professional advice for their sick children more frequently (Table 10.7).

An important finding is the absence of an association between maternal education and use of preventive health services. There is little difference in the proportions of educated and uneducated women who seek ante-natal care and both groups of mothers are equally likely to make sure that their children complete the recommended course of vaccinations. Ninety-seven per cent of all infants over the age of 40 days had been given the BCG inoculation. This impressive figure indicates that all mothers in the two urban communities have at least some knowledge of the benefits of preventive medicine. A second conclusion is that it is factors other than the awareness of the benefits of health care which determine the observed pattern of use of services.

The majority of mothers who do not register for ante-natal care reside in ash-Shaja'iyya. Indeed, although children in ash-Shaja'iyya experience a risk of dying before the third birthday which is 18 per cent higher than that for children in ash-Shati (Table 10.4), after controlling for ante-natal care the excess risk is reversed and children in the town are 12 per cent less likely to die than those in the refugee camp. Further investigation may help to establish why some women who take their infants to the Government clinic for the BCG vaccination neither avail themselves of the free ante-natal care provided at the centre nor continue to visit the clinic until their infants have been given all the scheduled inoculations. Mothers' complaints about the lengthy waiting times and frequent shortage of vaccination serum suggest that underfunding and inefficient management of the clinics discourages some mothers from regular attendance. Many

women in ash-Shati also dislike the way they are treated by the bureaucrats in the UNRWA clinic and this is possibly one of the causes of the vaccination drop-out rate in the refugee camp. On the other hand, the Agency's powdered milk distribution programme may be an incentive to refugees to register at the ante-natal clinic. Until further improvements in the services are made, health workers should use the occasion of the BCG vaccination to stress the importance of the completion of the vaccination schedule, to explain healthy infant feeding practices to mothers and to promote effective growth monitoring.

Compared with the children of teenage mothers who attend ante-natal clinics, infants born to women aged 35+ who received ante-natal care experienced significantly higher chances of dying. Thus, there is convincing evidence that both women and children would benefit if a higher standard of ante-natal care was available in the clinics in ash-Shati and ash-Shaja'iyya. In particular, special attention should be paid to the general health of older, poorly educated women and their pregnancies should be carefully monitored. However, there is also no doubt that the obstetric facilities in Gaza city are inferior to those in Israeli hospitals (see, for example, Anonymous, 1981). In 1984 the neonatal mortality rate in Israel was 7.9 deaths per thousand live births (Israel, CBS, 1986, SAI, p.122). The corresponding figure for the mothers in Gaza who received 10 or more years of education is 15.0 for the period mid-1982 to mid-1985 (see also, Table 8.10). The births to the latter group are not at risk as a consequence of advanced maternal age. Thus it is safe to conclude that variations in the facilities for managing both high risk pregnancies and high risk deliveries between Israel and Gaza city are at least partly responsible for the two-fold difference in the neonatal mortality rate in the 1980s.

The finding that girls experience higher neonatal mortality than boys is virtually unprecedented. If true, an obvious recommendation arising from this and from the other observed differentials in mortality and patterns of child care, is that clinic and hospital staff should pay greater attention to the health of girls and encourage mothers to do the same. Such a measure, in combination with improvements in obstetric care, should eliminate any excess of early neonatal female deaths. (For example, of the children born between mid-1982 and mid-1985, 8 of the 11 infants who died during the first week of life were girls. There were 7 male and 12 female deaths between the ages of one week and three years.) But reversing the sex differential in mortality at later ages is much more difficult. Mothers claim that they do not discriminate against girls. Indeed, that girls are not deliberately neglected is concluded from the finding that there is no difference in the

number of boys and girls who receive the measles vaccination. But procuring preventive medical care does not incur any financial cost and takes up only one morning every couple of months of a mother's time. In contrast, unsupplemented breast feeding requires the undivided attention of the mother for about two hours each day. The results obtained by using the current status technique, which eliminates reporting bias, demonstrate clearly that uneducated and educated mothers alike devote more time to their young sons. Other domestic duties take priority over the time-consuming task of unsupplemented breast feeding of daughters at an early age. Mothers are more attentive to the health of sons and, because of the greater value placed on male children mothers are more likely to spend time taking boys to a doctor when they are ill and families are more inclined to pay for curative treatment for boys.

For the overwhelming majority of families in ash-Shati and ash-Shajaʿiyya investment in the welfare of their male members represents a rational allocation of the limited total available resources. For educated and uneducated mothers, future security is linked to the survival of sons. In the short term mothers who have only daughters fear their husbands will divorce them or take a second wife; in the medium term teenage sons will make an important contribution to total household income; and in the long term once the father ceases to be economically active most parents will depend on their adult male offspring for financial support.

CHAPTER 11

CONCLUSIONS

The Palestinians are now scattered across the globe but are linked by their common ancestry and their attachment to the land of Palestine. They are differentiated by their responses to the momentous political events that have impinged on the lives of their families, by the degree of control they have over their own circumstances and by their interactions with their neighbours. While the Palestinian diaspora extends world-wide, this thesis concentrates on one part of the Palestinian population still living in the historic homeland. It is the first comprehensive investigation of demographic change among residents of the Gaza Strip. The thesis considers the experience of two groups, both of which have lived under the unusual condition of military occupation. One group are indigenous Gaza city Palestinians living in ash-Shajaʻiyya and the other are refugees and the children of refugees living in ash-Shati camp who originate from that part of Palestine which became the State of Israel in 1948.

Chapter 2 reviews the published literature on Palestinian fertility and sets the context for the Gaza marriage and fertility analyses that are presented in Chapters 6 and 7. In Mandatory Palestine, the patriarchal society valued large families and the survival of male children was an important factor in the prosperity of the nuclear and extended family. Among Muslims, marriage was universal, daughters were married soon after puberty and childbearing was interrupted only by widowhood or, less commonly, divorce. In the early years of British rule, the Muslim total fertility rate was probably around 7 births per woman but the evidence presented in Chapter 2 suggests that the total fertility rate rose slightly before the British departed from Palestine. Among Israeli Muslims, who are the Palestinian population for whom the most demographic data are available, fertility clearly increased after 1955 and total fertility peaked at 9.9 in 1965, before dropping by 50 per cent over the course of the next 20 years.

In Gaza, the cohort of women who were born in 1935-40 and completed their childbearing in the early 1980s married at a very young age and had very high fertility. By the end of their reproductive lives, refugees living in ash-Shati had borne 9.5 children

on average. By world standards, this is an exceptionally large family size. In ash-Shajaʻiyya, the fertility of this cohort was slightly lower, at about 8.4 children on average. By the mid-1980s, the relative levels of fertility in the refugee camp and Gaza town had reversed. The total fertility rate had fallen to about 6.6 children per woman in ash-Shati but remained about 8.0 in ash-Shajaʻiyya. At this time the level of fertility in the surveyed population was similar to that estimated for the Gaza Strip as a whole but was significantly higher than the Israeli Muslim total fertility rate of 4.7 in 1985.

The Gaza birth history data provide insights into the changes in fertility patterns that are not available from any other source. In the refugee camp, the decline in fertility started at the end of the 1960s or the beginning of the 1970s. By contrast, the drop in fertility in the town only began 10 years later. Focusing on births to women currently in their first marriage (Table 7.7), provides clear evidence of a reduction in marital fertility in ash-Shati but suggests that most of the decline in ash-Shajaʻiyya reflects changes in marriage patterns. In both populations, however, the fertility declines were preceded by an increase in the pace of childbearing among younger women. This corresponds to a reduction in the duration of breast feeding which affected the spacing between births.

The examination of marriage patterns in Chapter 6 describes the trend towards later marriage that is associated with the spread of schooling for girls. In this respect, the Gaza populations resemble their Palestinian and other Arab neighbours in their response to this gradual social development. More significantly, this thesis establishes for the first time that abrupt political change and associated economic developments can also affect Muslim nuptiality. Marriage patterns in Gaza were transformed in 1967. As a consequence of the immediate disruption resulting from the Israeli invasion of the Gaza Strip and the subsequent departure of young men, the median age at marriage of women rose abruptly by 1.6 years in Gaza town but by a massive 4.5 years in the camp. The impact on the 1945-50 birth cohort of refugees, who were aged 17-21 in 1967, was particularly dramatic: 14 per cent of these women remained unmarried by age 30 and few of them married subsequently.

The analysis of the proximate determinants of fertility in the 1980s reveals that the impact of delayed entry into marriage and non-marriage on fertility in Gaza was greater than their impact in Jordan and Syria in the 1970s, when total fertility was at a similar level. Conversely, the fertility-inhibiting effect of contraceptive use was lower among Palestinians than in these other two populations. Fertility differentials in the Gaza populations are largely accounted for by variations in these two proximate determinants.

In both the camp and the town, the total fertility rate among women with 10 or more years of schooling was about 1.5 children less than that among women with less education. As elsewhere, highly educated women in ash-Shati and ash-Shajaʻiyya married later than their less educated counterparts. In addition, however, the fertility of the highly educated was further depressed because it was these women who were affected by the exodus of young men following the 1967 war. A remarkable 25 per cent of the ash-Shati 1945-50 birth cohort (aged 35-39 in 1985) who had attended school for at least 10 years and 16 per cent of highly educated ash-Shajaʻiyya women had not married by 1985. These figures are in striking contrast to those for the equivalent cohorts with less than 10 years of schooling among whom 5 per cent of refugees and only 2 per cent of indigenous Gazans had never married. By 1985, 25 per cent of more educated and 24 per cent of less-educated women of childbearing age in ash-Shati had used a modern method of contraception. In contrast, while a similar proportion of women with 10 or more years of education in ash-Shajaʻiyya had used a modern method, hardly any uneducated women had done so. The disparity between the large educational differential in the propensity of women to control their fertility in the town and the lack of such a differential in the camp is explained by the much easier access that the latter women had to family planning. This service was added to the other UNRWA health programmes in ash-Shati in 1966.

Despite the increased use of contraception and the population's exposure to the promotion of family planning on Egyptian television, large families remain the norm in Gaza Strip. In the precarious economic conditions prevailing in this area and in the West Bank and, specifically, in the absence of a social security system, many parents need children, especially sons, to support them in their old age. In Israel and Jerusalem, where social insurance is compulsory, changes such as the employment of married women and reduced dependence on children for economic support have occurred particularly among the professional middle classes. It is this section of society that has led the process of fertility transition in these populations. In Gaza, the population is polarised between the lower classes and a small group of landowners and capitalists (Tamari and Scott, 1991) and combining childrearing with work outside the home is far less common. In the absence of radical social and economic change fertility in Gaza is unlikely to enter a period of rapid decline in the near future.

Chapters 3, 8, 9 and 10 present data on mortality. Child mortality in Palestine has been declining for at least 80 years. Even if the earliest mortality estimates derived from birth and death registrations are imprecise, it is clear that the transition in child mortality

was well under way before the British left Palestine. For example, between the end of the 1920s and the early 1940s, Muslim under-five mortality fell from over 400 to about 300 deaths per thousand. The pace of the decline has varied over time and between sub-groups of the Palestinian population but the published data provide no evidence of calamitous events disrupting the long-term downward trend.

The earliest estimates of child mortality provided by the Gaza survey are for the late 1950s. These figures are derived from a small number of births and are affected by both the omission of some early infant deaths and other types of reporting errors that are often found in retrospective survey data. Despite these problems, the first part of Chapter 8 shows that careful evaluation of the Gaza survey results provides firm evidence that under-five mortality was in the region of 225 deaths per thousand in 1962 and infant mortality was in the range of 150-170 deaths per thousand in the same year. Certainly, the level of child mortality in the two Gaza communities at this time was already lower than among Muslims in Palestine in the 1940s and the decline continued. Over the course of period covered by the survey, mortality at ages 1 to 4 plummeted. By the late 1970s, under-five mortality had dropped to 70 deaths per thousand while the probability of dying in the first year of life fell to 38 deaths per thousand in the period 1980-85.

The patterns of changes and differentials in the mortality of children of ash-Shati and ash-Shaja'iyya women who were interviewed in 1985 only provide clues as to what factors underlay the mortality decline. Nevertheless, they are suggestive. The analyses of all births between the late 1950s and 1985, that are presented in Chapter 9, indicate that variations in childbearing patterns and social and economic differences at the household and individual level all influenced child survival in Gaza. When other factors are simultaneously controlled, the largest mortality differential identified is at the level of the individual child, that is between a child who was born after a birth interval of less than 15 months and a child who followed at least two years after the preceding sibling. This finding is consistent with the results from surveys of other Arab populations but it is the first evidence of the impact of birth spacing on Palestinian child survival. Another finding is that the mortality of children born to teenage mothers relative to that of children of older mothers, declined over time. By 1975-85, the risk to children in this group was no longer significantly higher than the risk to the children of women aged 20-34. Although a significant change in the age distribution of teenage mothers occurred - 62 per cent of births to teenage mothers before 1965 were to women under the age of 17 compared with only 24 per cent in 1975-85 - other factors undoubtedly contributed to the low mortality

of the children of young mothers in the 1980s. First, as a consequence of the high value placed on motherhood, primigravidae are probably more pampered than any other group of women in Arab society. In addition, it is argued that, in contrast to their counterparts in rural parts of Palestine for example, young women in the urban communities of ash-Shati and ash-Shaja'iyya have relatively few responsibilities and distractions. They can therefore devote most of their time to caring for themselves and for their children.

Household wealth and mother's schooling had independent and significant positive effects on the survival of children born between the late 1950s and 1985. These two socio-economic determinants operate via different proximate mechanisms. Maternal schooling reduces the excess risk associated with the advanced age of the mother and is associated with a greater reduction in children's mortality in late infancy and at ages one to four than in the first few month of life. This evidence suggests that, compared with mothers who have received limited or no formal education, mothers with at least 6 years of schooling may provide a higher standard of general care, as opposed to sickness management, for their children. On the other hand, since the impact of household wealth on survival does not vary with the age of the child, a plausible explanation for the reduced mortality risks experienced by the children in wealthy households is that they receive more effective curative treatment than children in poor households when they are ill. Alternatively, or additionally, as increased wealth is associated with lower housing density, children in wealthy households may be less likely to suffer from respiratory diseases as a consequence of reduced exposure to airborne infections. In addition, other factors were associated with the mortality decline and had an impact on mortality similar in magnitude to the combined effect of maternal education and wealth. Although these factors could not be specified in the model, they are likely to have included community level developments such as improvements in water supply and health care advances.

Chapter 10 considers the survival chances of children born in the period mid-1982 to mid-1985. Conditions in ash-Shati and ash-Shaja'iyya had improved and neonatal and infant mortality had fallen to 13 and 26 deaths per thousand respectively. Despite the relatively low level of mortality, substantial differentials in the risk of dying persisted within the population. When other influences are simultaneously controlled, girls are more likely to die than boys and the children of older and poorly educated women and children whose mothers did not receive ante-natal care suffer relatively high mortality. The evidence available precludes drawing firm conclusions about the precise causes of these differentials. The investigation of child care practices does, however, provide

evidence of some possible proximate mechanisms. Boys are exclusively breastfed for longer than girls are, mothers are more likely to take male children who are ill to the doctor, and families are more inclined to pay for private treatment for sick sons than for sick daughters. In contrast, no evidence exists of sex differentials in preventive medical care, specifically vaccination coverage, in either ash-Shati or ash-Shajaʻiyya. Breast feeding consumes time and private medical treatment consumes precious family finances. Preventive health care, on the other hand, is free of charge and entails, at most, monthly visits to maternal and child health centres. Thus, sons would appear to be advantaged because mothers devote more time to their welfare on a daily basis and because, when deciding on the allocation of limited financial resources, parents prioritise the health of their sons over the health of their daughters.

By the mid-1980s, more educated and less educated mothers were equally likely to give birth in a medical centre, to seek ante-natal care for their children and to vaccinate their children. Yet the children of women with limited or no schooling experienced significantly higher mortality than the children of mothers who had attended school for more than 5 years. This again suggests that the more educated group are more proficient child carers than less educated women. However, the only direct evidence from the Gaza survey to support this assertion is that significantly more of the less educated women failed to give their infants food other than milk until after they were 7 months old.

The populations of ash-Shati and ash-Shajaʻiyya live in unusual circumstances. Both communities are urban with good access to health services. However, their populations were faced with restricted economic opportunities both before and during the Israeli military occupation. This thesis represents the first in-depth research into mortality in urban Palestine. But, because the Gaza Strip benefited from UNRWA services and the military government made efforts to provide similar health care facilities for non-refugees in the area, the study communities are probably not typical of urban populations in the West Bank. Mortality was already declining in the 1930s and the analysis in Chapter 3 suggests that public health measures played an important part in this. Child mortality also fell in the Gaza Strip before 1967 when economic conditions were particularly harsh and few women of child-bearing age had attended school. It is therefore reasonable to conclude that the UNRWA and Egyptian government's preventive health care programmes made a significant contribution to the improvements in child survival documented for this period. The survey results indicate that, from the 1960s onwards, socio-economic development including the education of women and preventive and

curative health care advances were both important in the later stages of the mortality decline. Thus, while different sets of factors may have played the dominant role in driving down mortality at different points in time, the evidence presented in this thesis favours a multi-factorial explanation of the mortality transition in the Gaza Strip.

One limitation of this thesis is that it has proved impossible to investigate all the factors that may influence fertility and child survival in the Gaza Strip. Part of the reason for this is the small size of the Gaza survey sample. Other limitations relate to the content of the questionnaires and the accuracy of responses. In particular, the questionnaires were designed without the benefit of the experience that has now been gained from DHS surveys. Most notably, the DHS have developed much better questions on use of maternity care services and child morbidity. Also, the important question on date of marriage was inadvertently omitted from the Gaza survey. Finally, it appears that interviewers sometimes failed to elicit accurate information on ages and dates of events and some births and early infant deaths were not recorded. The analysis of historical data from the Mandate period provides a longer perspective on the demographic history of this group but is, inevitably, limited by lack of information on co-variates of interest.

It is possible to identify several recommendations that should be considered by service planners in the new Palestinian Authority and research directions that are suggested by the findings of this thesis. The challenges facing health professionals and community workers in ash-Shati, ash-Shaja‘iyya and similar areas include ensuring that all women have access to effective ante-natal care, informing mothers that childbearing after age 35 carries additional risks and providing these women with a higher standard of medical care and modern methods of contraception. Eliminating excess female child mortality is more difficult. This will only be achieved if health professionals and the rest of the community work together to understand and then moderate social, economic and cultural factors that are the root cause of the disadvantaged position of many women and girls in Palestinian society.

The question of whether, in certain situations, Palestinian women are discouraged from marrying if they are gainfully employed, mentioned in Chapter 7, is worth exploring. Also, further information on the differential use of contraception in the refugee camp and in the town could be used to address unanswered questions about the impact of service availability on contraceptive uptake. Research into these two areas would probably be of a qualitative nature and involve reviews of health centre records. It is also desirable to see if some of the Gaza survey findings are generalisable both to other areas

and over time. For example, it is important to investigate the mortality patterns of children of absent fathers in order to establish whether this is a particularly high risk group in Palestine. Two excellent data sources that could yield information on such issues now exist, though they are not yet in the public domain. These are the 1995 Demographic Survey of the West Bank and Gaza Strip and the 1997 Palestinian Census, both conducted by the Palestinian Central Bureau of Statistics.

Policy making and planning based on empirical data is better than the application of models and prescriptions derived from other populations. Palestinians have been disadvantaged in many ways not least by the lack of data available for planning for their own needs. The Palestinian Authority has made substantial progress towards rectifying this situation by setting up systems for the collection of all types of social and economic data. The challenge is to ensure that the findings from in-depth analyses of all the available data sources, including this thesis, are exploited in such a way as to further the development of Palestinian society.

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APPENDIX A

QUALITY OF THE MANDATE STATISTICS

The demographic statistics for Palestine have been closely scrutinised by a number of researchers. This section summarises the findings of the more systematic of these investigations but focuses on those results which inform the assessment of the quality of the fertility measures.

The Mandate Government made birth and death registration compulsory in 1920. At first, a substantial number of female births were not registered. The situation soon improved, however, and between 1923 and 1927-30 the sex ratios for births fell from 116 to 107 (calculated from Palestine, DS, 1947, p.14). From 1932 onwards, the sex ratios for Christian and Jewish births were within the normal range but the average for Muslims of 107.5 in the years 1932-46 suggests that a small proportion of Muslim female births were never registered. Further assessment of the coverage of birth registration is only possible by comparing recorded births with survivors at the 1931 Census.

The 1931 Census of Palestine is the base for all the official population estimates and demographic rates produced during the Mandate. Most commentators accept that this Census provides a reliable estimate of the *de facto* settled[34] population of Palestine. From 1932 onwards, the annual estimates of the settled population in Palestine were derived by updating the Census population totals. The components of change used in this computation were registered births, registered deaths and arrivals and departures recorded at the borders. The same standard method was employed to produce population estimates after the 1922 Census. According to the 1931 Census Report, however, the settled population enumerated in 1931 exceeded the 1922-based estimate by 33,000 persons or 3.5 per cent (Mills, 1933a, p.45). Officials attributed the discrepancy to a shortfall of about 10,000 unidentified Muslim migrants, 2,000 unidentified Jewish migrants, and up

[34] Births and deaths among the Bedouin, who numbered less than 10 per cent of the total population, were rarely recorded. All the demographic rates for the Mandate exclude this population and this practice is followed here.

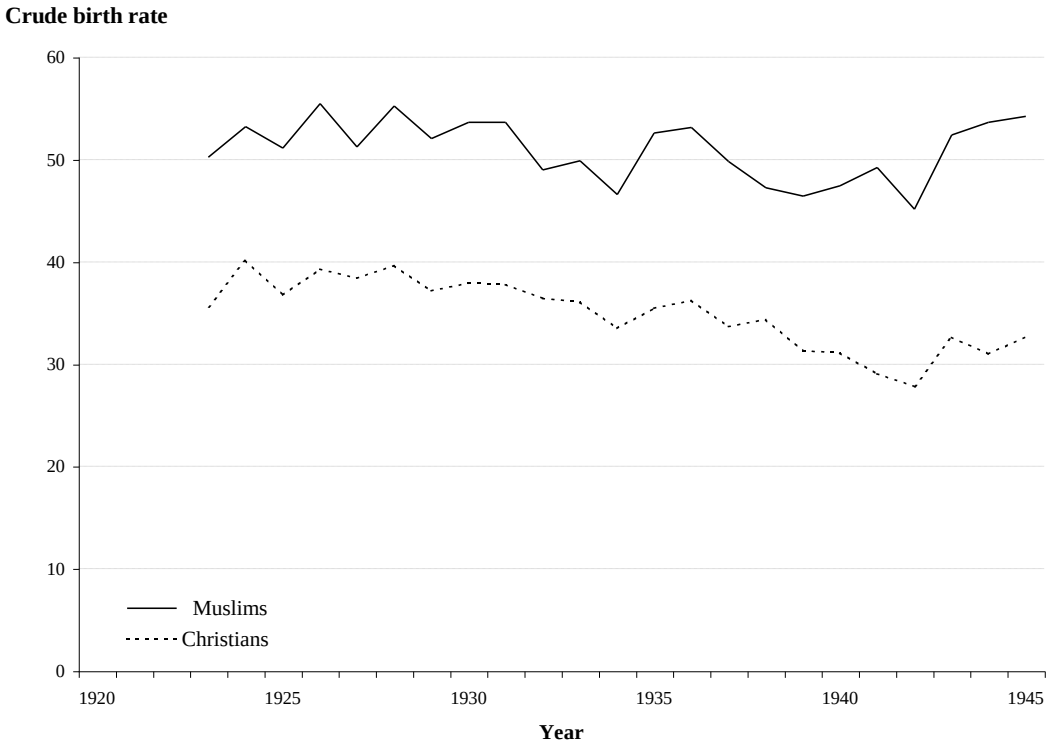

Figure A-1 Crude birth rates by population group, Palestine, 1925-44
Source: Palestine, DS (1947)

to 20,000 unregistered births.[35] From the ratio of the enumerated populations aged 0-4 to survivors expected from the registered births and deaths in the years 1927-31, the statisticians estimated that the underreporting of mainly Muslim births averaged about 2,000 births per year in the intercensal period (Mills, 1933a, p.116). The Government subsequently revised the population estimates for 1923-30 taking the omissions for each population into account. They did not, however, amend the numbers of births, deaths and migrants used in the calculation of the various rates.

Not surprisingly, the validity of the Government's approach has been challenged. Bachi, for example, agrees with the official estimate of unrecorded migrants but maintains that during the intercensal period only 7,500 female births were unrecorded (Bachi, 1977, pp.382-396). In Bachi's view, the remainder of the discrepancy between the 1922-based and the 1931 Census population estimates is due to an undercount of Muslims

[35] Since only two censuses were conducted in Palestine, the accuracy of the 1931 Census population totals cannot be assessed. Estimates such as McCarthy's (1990, p.30) of an undercount of 2 per cent are unconvincing because they are derived from a comparison of the reported numbers of males and females aged 0-14 and this ignores sex-selective age misstatement.

in the 1922 Census. Bachi's evaluation of the data is persuasive and he has produced an alternative set of population estimates for the years 1922-1930 (Bachi, 1977, p.396).

The official crude birth rates are shown in Figure A-1. The rates for the years 1923-30 are calculated from the Government's revised population estimates and uncorrected births. The Muslim birth rates for these years range from 50 to 56 births per thousand population. If the births were also adjusted upwards, they would be up to 4 births per thousand higher. In contrast, the Muslim crude birth rates produced from Bachi's estimates of births and annual population totals are no more than 3 per cent lower than the official rates (and his rates for Christians and Jews are within 1 per cent of the official rates). On balance, it seems likely that the true crude birth rates for Muslims were very close to the official rates even though the latter were derived from inconsistent measures.

The crude birth rates for the years after 1931 fluctuate more widely than the earlier figures because they are calculated from uncorrected data. Both Bachi and McCarthy assert that birth and death registration was disrupted by the Arab rebellion of 1936-39 and that, following the introduction of Government food control and the distribution of basic foodstuffs in 1943, an implausible reduction occurred in the number of reported deaths. According to Bachi (1955, p.25), '[Still], it seems that at least for certain periods, 1925 to 1935 and 1940 to 1942, data for live births and deaths among the settled population were complete or almost complete', and McCarthy (1990, p.32) states, 'The actual birth rate probably remained at 53-54 per thousand each year throughout the period [1936-48].' In addition to the evidence of a disruption of the vital registration system during 1938 (Palestine, OS, 1939, p.9), competing explanations exist for the trends and fluctuations in the crude birth rates between 1931 and 1946. For example, the data for birth registrations by month indicate that in 1934 and 1942, two years in which the birth rate was low but there were no atypical political or civil events, relatively few births were notified during the last quarter of the year and the deficit was followed by an above average increase in registrations during the first half of the following year (Palestine, DS, 1947, pp.32-33). Smoothing the annual rates to eliminate the effect of such notification delays suggests a gradual decline in the Muslim crude birth rate in the decade following the 1931 Census. Given the subsequent increase in the crude birth rate (and the Government's failure to find any evidence of fictitious birth notifications which could be associated with food distribution (Bachi, 1955, p.26)), it is difficult to dismiss this decline as simply the consequence of a gradual deterioration in the reliability of the population estimates used

in the rates. A more general explanation for the changes in the crude birth rates is suggested by an examination of the age structure of the population in 1931.

Analysis of the ages reported at the 1931 Census revealed 'saturation' on the digits 0 and 5 and less pronounced heaping on the digits 2 and 8 (Mills, 1933a, pp.101-110). To improve the quality of the data, the statisticians smoothed the reported ages and eliminated other gross errors thereby creating a set of 'graduated' age distributions. The reported and graduated age distributions for the Muslim population are depicted in Figure A-2. The sex ratios for the quinquennial age groups aggregated from the graduated numbers are also included in the figure. Despite the imperfections even in the graduated age distributions, genuine features which have a bearing on fertility are evident. The population pyramid shows a very small cohort aged 15-19 in 1931 and small adjacent cohorts. These deficits are explained by the high child mortality around the time of the First World War.[36] It is the gradual progression of the small cohorts of women through their twenties which accounts for the fall in the crude birth rate after 1931. This decline was reversed when the large number of girls who were aged 5-9 in 1931 started to bear children in the 1940s. Confirmation of an increase in the number of women commencing childbearing during the 1940s is provided by the statistics for first births. These increased steadily from 16 per cent of all births registered in 1938-39 to 21 per cent of births registered in 1944-45 (Palestine, DS, 1947, p.30).

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[36] The smallest single year cohorts were aged 13-17 in 1931 and these are the survivors of persons born in 1914-18. As McCarthy (1990, pp.25-27) notes, the fighting between the Ottomans and the British caused few civilian casualties, but the confiscation of agricultural produce and a plague of locusts in 1915 reduced the food available for the Palestinian population and this, combined with wartime diseases, must have reduced child survival. Another reason cited for the small size of the war cohort is the depressed birth rate caused by the prolonged absence of men conscripted into the Ottoman army (Bachi, 1977, p.37).

Presumably, the influenza pandemic of 1918-20 contributed to the post-war excess of child mortality. (The pandemic reached North Africa in May 1918 (Mills, 1989, p.224) and by late summer was causing casualties among the (British) Egyptian Expeditionary Force who captured Palestine from the Turks (Wilson, 1987, p.122).) On the other hand, although very little is known about the end of the Ottoman period, inequalities in land-holding and the number of landless labourers seem to have been increasing (Owen, 1981, p.270). Economic disruptions of this kind could have affected either birth rates or child mortality rates or both and may account for the relatively small size of the cohort aged 20-24 in 1931.

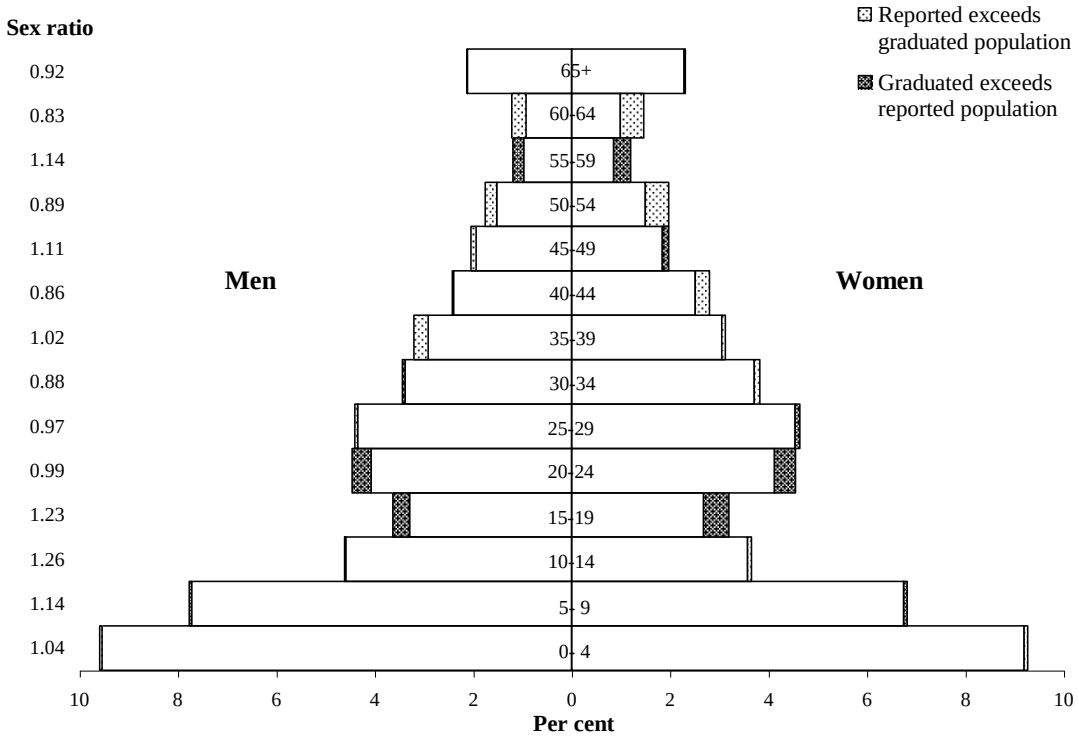

Figure A-2 Sex ratios and percent distribution by age and sex of the Muslim population, Palestine, 1931

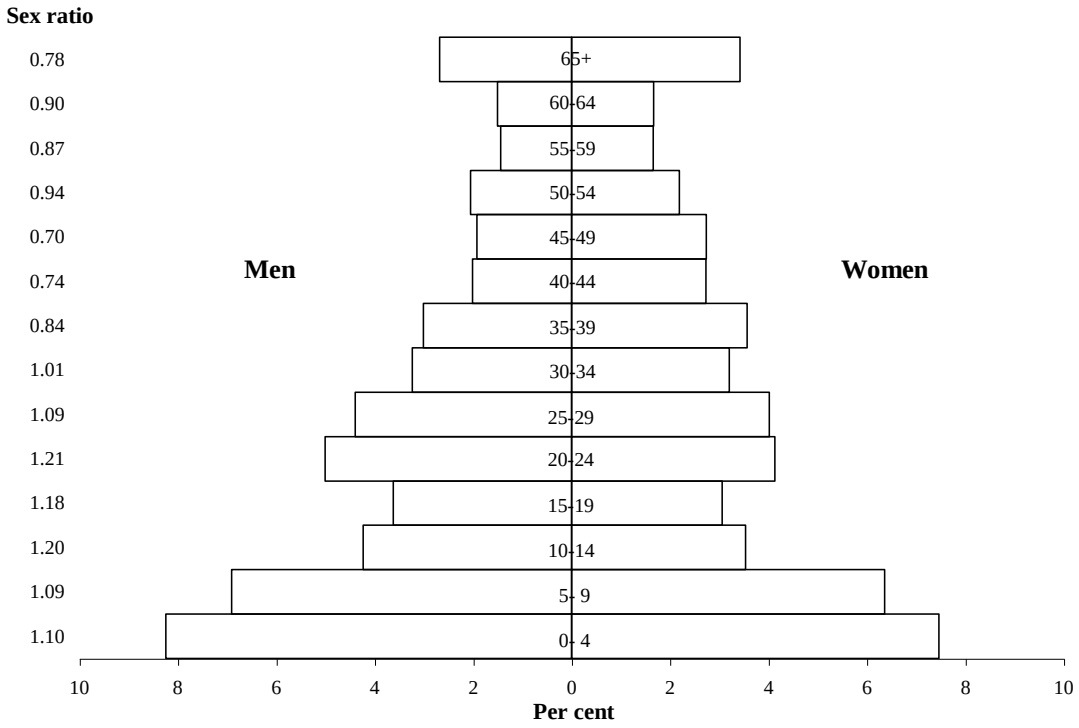

Figure A-3 Sex ratios and percent distribution by age and sex of the rural Christian population, Palestine, 1931

In contrast to crude birth rates, reliable estimates of age-specific fertility rates require accurate information on both the ages of mothers when their infants are born and the ages of women in the population. Collection of data on mother's ages only began in 1938 and, according to Bachi (1955, p.28), the registration data reveal many inconsistencies between ages of parents, marriage duration and birth order. For the years 1931-37 (and, presumably, 1926-30), the total fertility rates were calculated from, 'the actual figures of births of that period and the substituted age specific fertility rates of the period 1938-42' (Loftus, 1948, p.108). As far as the denominators for the rates are concerned, it is clear from the sex ratios shown in Figure A-2 that the 1931 age distributions are distorted by systematic age misstatement. In particular, there are too few girls aged 10-14, a small deficit of women aged 15-19, and too many women in the age groups between 20 and 50. A probable explanation for these errors is a tendency to exaggerate the ages of married women. Since the denominators for all the age-specific and total fertility rates are derived from projections of the 1931 population distribution, all the rates must be distorted. For example, the 1931 rates underestimate the level of fertility because age exaggeration resulted in the transfer of some girls from the 10-14 age group into the reproductive ages. Also, the implausibly high age-specific fertility rates in the 1940s (Table 2.1) reflect the same defectively small cohort progressing through their twenties. In fact though, the explanation for the anomalies in the age-specific rates in the 1940s is more complicated since it would appear that, up to 1942, the denominators for the rates were derived from the graduated age distribution, then, from 1943 onwards, the reported ages were used.[37]

[37] This is inferred from the following comments in the text of the Government report which accompanied the publication of the age-specific fertility rates and from a comparison of the 1931 reported and graduated ages.

> This trough [corresponding to survivors from births in the years 1910-1920] appears, however, to be deeper and wider than it really is, owing to various technical reasons inherent in the methods of computation of the tables and this results, in recent years, in an understatement of the number of females particularly in age-groups 20-29.
>
> …Unfortunately, the underestimate of women at ages 20-29 referred to above influences to a high degree the rates for these ages, mainly in the two years 1943-44; in those years the rates reach a level which is physiologically impossible…The rates for the previous years must also be considered as somewhat exaggerated, although they have been subject to a correction through smoothing the number of women aged 20-29 on which they are based. (Palestine Government, 1946, Vol. III, pp.1147-48)

The jump in the age-specific fertility rates for 25-29 year-olds from 0.459 in 1942 to 0.612 in 1943 (Table 2.1) is consistent with a substantial reduction in the number of women in the age group. In 1931, there were 19,571 women with reported ages 14-18 (25-29 in 1942) and 15,742 women with reported ages 13-17 (25-29 in 1943). The corresponding figures for the graduated ages are 20,597 aged 14-18 and 19,993 aged 13-

The demographic data for Christians in Palestine reveal many features and patterns which are similar to those described for Muslims. These include fluctuations and a downward trend in the crude birth rate from 1931 to 1941 and an increase in the rate after 1942, although, unlike for the Muslim population, the birth rate did not return to its 1931 level (Figure A-1). There was also an increase in the proportion of first births - from 18 per cent of all births in 1938-39 to 24 per cent of all births in 1942-43 (Palestine, DS, 1947, p.30). Thirdly, as Figure A-3 shows, there is evidence of inaccurate age reporting at the 1931 Census and of the adverse conditions which prevailed in the years 1910-1920. (The age distribution for rural Christians is presented in Figure A-3 because the distribution for all Christians is distorted by the inclusion of Europeans and Americans who comprised over 10 per cent of the Christian population. These groups lived mainly in the towns and most were adults; they included many soldiers and policemen in their twenties, Government officials. and female missionaries and social workers.) As in the Muslim population, it is likely that the systematic exaggeration of women's ages in 1931 contributed to the apparent increase in the total fertility rate from 3.9 in 1940-42 to 4.4 in 1943-45. In the Christian population, however, there was less pronounced heaping on ages ending in favoured digits (Mills, 1933a, p.153). It would also appear that the ages of Christian mothers were more accurately reported than the ages of Muslim mothers. This is suggested by the rates in Table 2.1 which show reasonably close agreement between the Mandate and Israeli age-specific fertility rates for young Christian women but suspiciously low rates for Muslim women age 15-19 in 1938-45.

The consistency in the findings for Muslims and Christians is, in part, encouraging as it strengthens the conclusion that the Mandate data provide both plausible estimates of crude birth rates and convincing explanations for the fluctuations and trends in these measures. But, whereas the inaccuracies in the age reporting for Christians do not seriously undermine the estimates of their age-specific and total fertility, the errors in the reported ages for Muslims result in an irregular and inconsistent series of rates. A reliable age distribution for Muslims during the Mandate cannot be derived because of the impact of the First World War on the population and because the age reporting for males, while better than that for females, was imperfect.

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17 (Mills, 1933a, p.149). A switch from graduated ages in 1942 to reported ages in 1943 would reduce by 25 per cent the number of women in the denominator for this rate, raising the total fertility rate by about 0.75.

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APPENDIX D

Table D-1 Proportion ever-married and mean number of children ever-born by single years of age, ash-Shati and ash-Shajaʻiyya

Age	Proportion ever-married (per 1000)		Mean number of children ever-born					
	Ash-Shati	Ash-Shajaʻiyya	Ash-Shati			Ash-Shajaʻiyya		
			Male	Female	Total	Male	Female	Total
15	37	136	0	0	0	0	0	0
16	155	143	0.03	0	0.03	0.02	0.04	0.05
17	296	147	0.10	0.04	0.14	0.06	0	0.06
18	266	414	0.08	0.13	0.20	0.12	0.22	0.34
19	412	500	0.18	0.20	0.37	0.30	0.35	0.65
20	545	512	0.41	0.32	0.73	0.29	0.44	0.73
21	648	718	0.72	0.46	1.19	0.64	0.69	1.33
22	500	688	0.38	0.34	0.72	0.41	0.81	1.22
23	655	875	0.62	0.62	1.24	1.13	1.09	2.22
24	676	808	0.86	1.08	1.95	1.23	1.08	2.31
25	676	826	0.88	1.18	2.06	1.09	0.91	2.00
26	750	892	1.32	1.04	2.36	1.84	1.65	3.49
27	895	840	1.58	1.47	3.05	1.24	1.60	2.84
28	882	938	1.65	2.18	3.82	1.81	2.25	4.06
29	857	889	1.64	1.21	2.86	2.22	2.17	4.39
30	792	1000	1.92	1.83	3.75	2.95	2.41	5.36
31	1000	931	2.24	2.00	4.24	3.45	2.76	6.21
32	889	867	3.11	2.00	5.11	2.80	2.13	4.93
33	826	929	2.65	2.35	5.00	2.21	3.00	5.21
34	1000	833	3.08	3.33	6.40	2.78	2.17	4.94
35	833	1000	2.83	2.33	5.17	2.82	3.88	6.71
36	900	933	2.50	2.40	4.90	3.00	3.00	6.00
37	895	960	3.63	3.16	6.79	2.48	3.36	5.84
38	842	944	3.53	2.63	6.16	2.78	2.50	5.28
39	889	846	3.56	3.39	6.94	3.31	2.77	6.08
40	875	1000	3.63	3.38	7.00	5.00	5.88	10.80
41	750	941	3.25	3.25	6.50	3.41	2.94	6.35
42	944	1000	3.72	4.61	8.33	3.92	3.08	7.00
43	1000	1000	4.82	4.76	9.59	6.36	3.21	9.57
44	1000	1000	3.83	4.17	8.00	4.00	3.00	7.00
45	1000	1000	4.58	5.08	9.67	4.14	5.14	9.29
46	1000	1000	4.81	3.86	8.67	4.23	4.23	8.46
47	1000	1000	5.10	3.50	8.60	3.00	3.67	6.67
48	962	1000	4.23	4.69	8.92	4.42	3.46	7.88
49	947	1000	4.47	3.47	7.95	4.00	4.20	8.20